PROCEEDINGS

OF THE

TWENTY-SIXTH GENERAL MEETING

OF THE

NATIONAL VETERINARY ASSOCIATION.

HELD AT

THE PAVILION, BRIGHTON,

ON

August 11th and 12th, 1908.

H & W. BROWN, PRINTERS, 20 FULHAM ROAD, LONDON, S.W.

22500346275

Med
K52934

PROCEEDINGS

OF THE

TWENTY-SIXTH GENERAL MEETING

OF THE

NATIONAL VETERINARY ASSOCIATION.

HELD AT

THE PAVILION, BRIGHTON,

ON

August 11th and 12th, 1908.

H. & W. Brown, Printers, 20 Fulham Road, London, S.W

WELLCOME INSTITUTE
LIBRARY
Coll. welMOmec
Call
No. V

CONTENTS.

PAGE.
Officers - - - - - 5
Abstract of Secretary's Report - - - 7
Financial Statement - - - - 8
Order of Proceedings - - - - 9
General Meeting - - - - 10
Members Present - - - - - 10
Address by the Mayor - - - - 10
The Late Mr. F. W. Wragg - - - 11
Next Meeting - - - - 12
Election of Officers - - - - 12
Life Vice President - - - - 14
Alteration of Rule 37 - - - - 14
Congress of R.I.P.H.,—Report by Mr. F. W. Garnett 15
Address by the President - - - - 17
Paper on The Organ-Incidence of Cancer in Domesticated Animals, by J. A. Murray, M.D. - - - 21
  Opening of Discussion by Mr. F. Hobday - 27
  Remarks by Prof. G. H. Wooldridge 31, Messrs. E. L. Dixson, W. Hunting 35, R. Hughes 36, G. H. Livesey 37, P. J. Howard 40.
  Reply by Dr. Murray - - - 41
Vote of Thanks - - - - - 49
Election of Hon. Associate - - - 50

CONTENTS.

PAGE.

Paper on Tuberculosis in its relation to Meat and Milk, by John S. Lloyd, F.R.C.V.S. - - - 52

Opening of Discussion by Mr. S. Stockman - 93

Remarks by Messrs. J. Cameron 98, Prof. J. Macqueen 100, F. W. Garnett, J.P., 104, E. L. Dixson 105.

Memorial of the late Hon. Treasurer, Mr. F. W. Wragg - 107

Congress of Royal Sanitary Institute,—Report by Mr. W. A. DellaGana, F.R.C.V.S. - - - 108

Resumed Discussion on Mr. J. S. Lloyd's Paper - 113

Remarks by Messrs. W. Hunting 113, F. L. Gooch 117, J. J. Bell 119, F. G. Samson 120, J. McGavin 121, The President 121, S. Stockman 122, E. W. Baker 122.

Reply by Mr. J. S. Lloyd - - - 123

Paper on Skin Diseases of the Dog, by Geoffrey H. Livesey, M.R.C.V.S. - - 127

Opening of Discussion by Mr. James Peddie - 147

Remarks by Messrs. W. A. DellaGana, E. H. Stent 155, E. L. Dixson, E. W. Baker 157, P. S. Howard 158, F. Hobday 159, F. L. Gooch, F. W. Garnett 163, G. H. Wooldridge 165, E. W. Hoare 166, The President 167, G. Smith 168.

Reply by Mr. G. H. Livesey - - - 169

Paper on Redwater in England and its carriers, by Stewart Stockman, M.R.C.V.S. - - 176

Votes of Thanks - - - - 188

National Veterinary Association.

GENERAL MEETING,

1908.

SECRETARY'S REPORT.

President.

R. Roberts, Esq.

Life Vice-Presidents.

Principal McCall
Professor J. Wortley Axe
Mr. J. Malcolm
J. F. Simpson, J.P.
J. Mackinder
J. M. Parker
E. Faulkner
W. Hunting
W. Bower

Mr. A. W. Mason
W. H. Bloye
Matthew Hedley
Prin. J. R. U. Dewar
Sir J. M'Fadyean
Mr. F. W. Garnett, J.P.
Chas. Allen
R. C. Trigger, J.P.

Vice-Presidents.

Mr. R. Porch
E. W. Baker
J. B. Martin

Lt. Genl. Fred Smith, C.B.
Mr. T. B. Goodall
C. Pack

Council.

Mr. S. Stockman
G. A. Banham
J. McKinna
F. G. Samson
C. Sheather
Prof. J. Macqueen

Mr. E. G. Crowhurst
H. G. Lepper
A. Wheatley
Sidney Villar
Prof. J. Dunstan
Mr. Tom Olver

Members of the Association who are also President or Secretary of an existing local Veterinary Society—

Presidents

Mr. J. W. Coe,
P J. Howard,
F. Low,
J. McKinna,
Prin. A. E. Mettam,
J. Peddie,
E. H. Stent,
R. C. Tennant,
J. Willett.

Secretaries :

Mr. W. Ascott,
W. Awde,
H. J. Dawes,
J. T. Share-Jones,
G. H. Locke,
J. R. McCall,
J. McKenny,
J. Robertson,
J. Alex. Todd.

Provisional Committee.

Chairman : Mr. W. K. Stuart.

Mr. H. Smith
J. H. Lockwood,
H. E. A. Charles
B. H. Benson
H. Gray
C. A. Squair
T. Bolton
C. W. W. Brown
J. A. Todd,
G. W. Bloxsome
C. Roberts
A. C. Wylde

Mr. G. H. Livesey,
F. T. Walder
J. S. Channon
W. A. Della Gana
J. E. Wallis
J. W. Pritchard
J. C. Munby
E. M. Perry
D. Pugh
J. T. Angwin
P. Simpson
H. Green

Hon Secretary: Mr. W. Burt, Junr.

Trustees.

Messrs. F. W. Wragg; R. C. Trigger; J. F. Simpson, J.P.

Auditors.

Messrs. S. Villar and J. Macqueen.

Treasurer.

F. W. Wragg, Church Lane, Whitechapel.

Secretary.

Wm. Hunting, 16 Trafalgar Square, Chelsea.

The Twenty-Fifth Annual Meeting was held at Great Yarmouth on July 24th and 25th, 1907, under the Presidency of W. Shipley, Esq., F.R.C.V.S.

The proceedings were published and issued to all the members.

A Council Meeting was held at Brighton on Sept. 26th, 1907, at which the Provisional Committee for the year was elected.

A Council Meeting was held at Brighton, on May 2nd, 1908, for consideration of the invitations issued by the Sanitary Institute and the Royal Institute of Public Health. It was decided to send delegates to each, and The President and Mr. Garnett were asked to attend the Congress at Buxton; and Messrs. G. D. Davies and W. A. Della Gana to attend the Congress at Swansea.

The Provisional Committee have made all arrangements for the Annual Meeting, 1908, at The Pavilion, Brighton, on August 11th and 12th, and have drawn up the following order of proceedings:

Dr. *F. W. WRAGG, Treasurer, in account with The National Veterinary Association.* Cr.

1907-8.	£	s.	d.	£	s.	d.
To Balance				152	16	5
,, 218 Subscriptions ...	114	9	0			
,, 87 Arrears	45	13	6			
,, 2 Life Subscriptions ...	10	10	0	170	12	6
,, One year's dividend on £400 Consols				9	10	0
				£332	18	11

1907-8.	£	s.	d.	£	s.	d.
By Printing, Secretary ...	68	17	3			
,, ,, Local ,, ...	6	14	6	75	11	9
,, Postage Secretary ...	8	6	10			
,, ,, Local ,, ...	1	5	0			
,, ,, Treasurer ...	0	9	0	10	0	10
,, Expenses of Meeting ..				4	14	0
,, Hire of Lantern ...				1	5	0
,, Local Secretary's Expenses				0	14	2
,, Carriage of Parcels ...				0	11	2
,, Hire of Rooms, Secretary ...	2	7	0			
,, ,, Local ,, ...	3	0	0	5	7	0
,, Grant to Annual Dinner ...				10	0	0
,, Reporting				24	0	4
,, Advertising				11	10	0
,, Secretary's Expenses, Yarmouth				3	0	0
,, Delegates' Expenses,—						
Professor Share Jones	4	4	0			
Mr. Woods ...	4	4	0	8	8	0
,, Subscription, Sanitary Congress	2	2	0			
,, ,, Buxton Congress	2	2	0	4	4	0
,, Balance				173	12	8
				£332	18	11

	£	s.	d.
To Balance	173	12	8
,, Amount invested in Consols	400	0	0

Audited and found correct,

J. Macqueen,
Sidney Villar, } *Auditors.*

National Veterinary Association.

MEETING AT THE PAVILION, BRIGHTON,
On August 11th and 12th.

President, Mr. R. ROBERTS, F.R.C.V.S.

ORDER OF PROCEEDINGS.

FIRST DAY (Tuesday, August 11th.)

10 a.m.	**"Cancer in Animals,"** by Dr. J. A. Murray, M.D.
1.30 a.m.	Luncheon.
2.30 p.m.	**"Tuberculosis in reference to Meat and Milk,"** By John S. Lloyd, F.R.C.V.S. Reception at The Pavilion by the President, (R. Roberts, Esq.,) from 4 to 7.
7 p.m.	**Annual Banquet.**

SECOND DAY (Wednesday, August 12th.)

10 a.m.	**"Some Skin Diseases of the Dog,"** By G. H. Livesey, M.R.C.V.S. Discussion opened by Jas. Peddie, F.R.C.V.S.
1.30 a.m.	Luncheon.
2.30 p.m.	**Discussion on "Red Water,"** Opened by Professor Stockman.

THIRD DAY (Thursday, August 13th.)

Excursion to Arundel. Luncheon provided by the Southern Counties V.M.S.

TWENTY-SIXTH GENERAL MEETING,

Held at The Royal Pavilion, Brighton,

August 11th and 12th, 1908.

Mr. R. ROBERT, F.R.C.V.S., President, in the Chair.

There were present:—Messrs. N. Almond, E. W. Baker, G. A. Banham, G. J. Bell, J. J. Bell, W. H. Bloye, G. E. Bowman, W. Burt, A. L. Butters, C. J. Byner, J. Cameron, J. H. Carter, W. R. Clarke, E. G. Crowhurst, W. A. Della Gana, E. L. Dixson, A. Dobbyn, J. Dunstan, G. Elphick, F. Garnett, C. H. Golledge, F. L. Gooch, W. A. Hancock, J. F. Healy, E. W. Hoare, F. Hobday, J. Holland, C. W. Howard, P. J. Howard, P. S. Howard, G. Howe, R. Hughes, W. Hunting, J. Hutton, E. H. Leach, H. G. Lepper, A. Levie, G. H. Livesey, J. S. Lloyd, J. McI. McCall, J. McGavin, J. Macqueen, J. B. Martin, C. Pack, C. F. Parsons, J. Peddie, R. Porch, D. Pugh, C. Roberts, R. Roberts, T. A. Rudkin, E. C. Russell, F. G. Samson, W. Shipley, J. F. Simpson, S. H. Slocock, W. W. Smart, S. Smith, A. Spreull, E. H. Stent, S. Stockman, A. G. Todd, J. A. Todd, J. Willett, W. Wilson, S. Wharam, G. H. Wooldridge.

Visitors: Messrs. W. Burt, B. A. Jarvis, J. J. Kelly, D. B. Rodger, W. K. Stuart. Mesdames. Bailey, Banham, Carter, Dunstan, Gooch, Hopkin, Lloyd, Simpson, Smith, Spreull, Stockman, Todd, Wooldridge. Misses. M. E. Bowman, F. Butters, L. Hunting, H. Lloyd, K. Lloyd, M. B. McGavin.

First Day. Tuesday, August 11th.

The President: Ladies and gentlemen, The Mayor of Brighton has been so kind as to come this morning at rather short notice to give us a welcome to this lovely town, over which he presides. I introduce to you the Mayor of Brighton, Alderman J. P. Slingsby Roberts, J.P.

The Mayor of Brighton, who was received with loud cheers, said: Mr. Chairman, ladies and gentlemen, I come here to express the pleasure which we Brightonians feel at your Association honouring us with a visit. I understand that it is the first time your Society has come here. Well, I do not like to blame you at all, but I think you ought to be ashamed of yourselves that you have not been here rather sooner (Hear, hear, and laughter). However, it is never too late to mend, and now you have paid us one visit I hope you will pay us many more (Hear, hear). The room is rather empty at present, but I suppose every member of your Association travels by motor-car (Laughter), and that some of those motor-cars have, as motor-cars will, broken down (Laughter). Perhaps some of the drivers have gone to the Police-Court, and are now being fined (Laughter); but however that may be, I hope they will pay their fines and be here for the subsequent proceedings (Laughter). I am very sorry, ladies and gentlemen, I cannot stay to hear some of the papers which will be read. One of them is on a subject in which I take a very strong interest, and I think everybody must take a very strong interest, and that is the question of Cancer Research; but I hope I shall be able to see a *précis* of those papers, which I shall read with a great deal of interest.

Now I must ask you to please let me go, because there are some prisoners waiting for me very anxious to be tried (Laughter). I want to be there, because I may have to let some of them off (Cheers). I have had a very kind invitation to dine with you to-night, and I mean to accept it—(Cheers)—in fact, I have accepted it, and I suppose you will hear a few words from me later in the day. So that I will simply say *au revoir* (Cheers).

[The Mayor then withdrew.]

The PRESIDENT: We now commence the Business session of the meeting. I am delighted to see such a great muster of the fair in our meeting this morning, but the ladies perhaps may not feel very much interest in the details of the business we shall have to discuss.

The first business on the Agenda is the confirmation of the Minutes of the last meeting. I will be glad if someone will move, and another member second, that they be taken as read.

Mr. WILSON moved and Mr. J. J. BELL seconded, that the Minutes of the last meeting be taken as read and confirmed.

THE LATE MR. F. W. WRAGG.

The PRESIDENT: It now falls to my lot to say a word or two respecting the lamented death of our late Hon. Treasurer, Mr. Wragg. He would have been with us no doubt at the meetings to-day had he been alive, and I am sure his spirit is with us now. I have not been at a meeting of the National at which he has not been present. He has been suddenly removed from us, much to our regret. We all know that he was a man of the highest character; he was full of mirth and wit; he was a quaint man and, withal, one of the best-hearted men that we ever met. We are sorry for his relatives; we are sorry for ourselves as a Society; we are sorry for the profession as a whole at his death. Every one of us feels that we have lost a friend indeed. I now move that a vote of condolence be sent to Mrs. Wragg and the members of the family sympathising with them in their great loss.

The resolution was carried in silence, everyone present upstanding.

NEXT MEETING.

The PRESIDENT : The next business is to fix the place of meeting for next year.

Mr. J. F. SIMPSON : I beg to propose, in accordance with the recommendation of the Council to this meeting, that our next place of meeting be Harrogate. We have received a very hearty invitation from the Yorkshire Association to hold our next meeting in that important town and health resort. Seeing that the invitation comes so heartily from such an important Association as the Yorkshire, I feel sure that we shall be safe in leaving the arrangements to them, both for our intellectual improvement and for our personal comforts. I have very much pleasure in proposing that the invitation of the Yorkshire Association be accepted, and that the next meeting of the Association be held at Harrogate.

Mr. S. WHARAM : I beg to second Mr. Simpson's proposition.

The resolution was put and carried unanimously.

ELECTION OF OFFICERS.

The PRESIDENT : The next business is the election of President for next year. At the Council meeting last night the name of Mr. George Bowman, of Leeds, was unanimously adopted for recommendation to this meeting. I have therefore great pleasure in proposing as the President for next year Mr. George Bowman, of Leeds, and I ask you to signify by acclamation your approval of his appointment.

The resolution was carried by acclamation.

The PRESIDENT : We shall be pleased to hear a word from Mr. Bowman, if he feels disposed to address us.

Mr. G. E. BOWMAN, who was received with cheers on rising to acknowledge his election, said : Mr. President, ladies and gentlemen, I am extremely obliged to you for electing me as President for the coming year. I assure you that I feel it is a very great honour indeed. When I was approached by the Council of the Yorkshire Society to allow my name to be nominated as the President, I was rather afraid of accepting such a post, simply because I thought I was the wrong man for the place. But after giving the matter careful consideration, I have decided that I shall be delighted to act as your President, and to do the very best in my power to make the meeting a success, and to give you a hearty welcome to Yorkshire. (Cheers).

The PRESIDENT : I will now ask the Secretary to read the list of Vice-Presidents recommended for next year.

The SECRETARY (Mr. W. Hunting) : The Council recommend the following gentlemen as Vice-presidents for next year :—

Messrs. R. Roberts, Tunbridge Wells ; J. A. Todd, Worthing ; S. Wharam, Leeds ; W. Burt, Jun., Brighton ; J. McKinna, Huddersfield ; and J. S. Lloyd, Sheffield.

On the motion of Mr. R. Hughes, seconded by Mr. F. L. Gooch, the above mentioned gentlemen were unanimously elected as Vice-presidents.

The PRESIDENT : The Secretary will now read the names suggested by the Council for election.

The SECRETARY : The Council recommend that the following gentlemen be elected as the Council for the ensuing year :— Messrs. J. Abson, Sheffield ; J. W. Coe, Stoke-on-Trent ; John J. Bell, Carlisle ; S. Locke, Manchester ; F. L. Gooch, Stamford ; W. A. Taylor, Manchester ; R. Hughes, Oswestry ; W. Woods, Wigan ; J. Cooke, Scarborough ; J. H. Carter, Burnley ; W. N. Dobbing, Darlington ; and A. Porritt, Preston.

On the motion of Mr. G. A. Banham, seconded by Mr. F. G. Samson, the above mentioned gentlemen were unanimously elected as the Council for the ensuing year.

The PRESIDENT : For your information I may say that the Council have elected Mr. F. W. GARNETT, of Windermere, as a Trustee in the place of our lamented friend Mr. Wragg, and have also elected Mr. J. F. SIMPSON, of Maidenhead, as Treasurer of the Association in the place of the late Treasurer.

The PRESIDENT : I am now going to put a name before you which will be quite as popular as any that has been mentioned before : it is the election of our permanent Secretary, Mr. Hunting.

Mr. J. J. BELL : As one of the oldest members of the Association I have very great pleasure indeed in proposing Mr. Hunting as our permanent Secretary. Probably no man is better adapted for the office he holds, and I have very great pleasure in moving his re-election.

Mr. SYDNEY SMITH : I have very great pleasure in seconding that.

The PRESIDENT : That resolution has my heartiest support. Nobody knows the great amount of help that our Secretary has given me this year, and no one but those who have occupied the position of President can tell how invaluable he is to our Association. As long as we have him everything works smoothly on oiled wheels, and I believe it will do so as long as he is the Secretary of the Association. We are very thankful to have such an able general Secretary as Mr. William Hunting, and it gives me very great pleasure indeed to put the proposition to the meeting, that he be elected Secretary for the ensuing year.

The resolution was put and carried with acclamation.

Mr. HUNTING : Ladies and gentlemen, the speeches of the two gentlemen immediately preceding me ought to make the members of this Association extremely pleased. One of them told you that I was the permanent Secretary—that is a sort of immortal; and the other told you that I always keep the thing going properly. If I always keep the thing going properly and I am to remain here permanently and for ever, what a blessed Society it will be. (Laughter).

LIFE VICE-PRESIDENT.

It is my very pleasing duty to propose that the name of our late President, Mr. William Shipley, of Yarmouth, be added to the list of Life Vice-presidents of this Association. (Cheers).

The resolution was carried by acclamation.

Mr. WILLIAM SHIPLEY : Mr. President, ladies and gentlemen, I wish to thank you very much indeed for the honour you have done me by electing me a Life Vice-president. I hope I shall live long to enjoy it, and my services will always be at the disposal of the Association.

ALTERATION OF RULE 37.

The PRESIDENT : The next business is the alteration of Rule 37, Sub-section 1. At present it reads, " The President, Vice-presidents, Treasurer and General Secretary of the Association be members of the Council," and it is proposed to add to that " the late President." So that the rule will then read : " The President, late President, Vice-presidents, Treasurer, and General Secretary." If that is in accordance with your wishes, will you signify in the usual way ?

The resolution was put and carried unanimously.

THE PUBLIC HEALTH CONGRESS.

The next business is to receive the reports of the delegates to the Health Congresses at Buxton and Swansea. I was myself appointed a delegate to the Health Congress at Buxton, but it unfortunately happened that I was quite prevented from going. I had two or three other public engagements to fulfil, and at the time of my acceptance of the position as your delegate I was not aware of those engagements, in fact I did not know of two of them until the last few days. Therefore I much regret to say I was unable to attend on your behalf at the meeting of the Health Congress at Buxton. But I am glad to say that my colleague who was appointed with me, Mr. Frank Garnett, of Windermere, attended ; he is present at the meeting, and we shall be glad to hear his report of what took place. I regret it is not a conjoint report, and that he has had to do all the work single-handed. I must express to him as well as to you the regret I feel at not having been able to attend the gathering of the Health Congress, which was attended by representatives from all over the country who were interested in important questions of public health. I hope you will accept my apology for not being able to attend.

REPORT BY MR. F. W. GARNETT.

Gentlemen,—I beg to report that I attended the Congress of the Royal Institute of Public Health, held at Buxton, July 18th-24th, 1908. I regret to say that so far as the Veterinary Section was concerned it was not a success, this was owing to the non-informative programme issued to delegates—no dates being fixed for the meetings of the Veterinary Section, and it was only by chance that the President of the Section, Professor Penberthy, was present on Tuesday, the 21st. So meagre was the attendance on that day that it was determined to hold over the Presidential Address till the following day. Some delegates attended on Tuesday, others on Wednesday and others on Thursday, by which date the Veterinary Section had finished its work. The Thursday meeting should have been held conjointly with the Preventive Medicine Section, but it was resolved at the end of the Wednesday meeting to withdraw officially from the conjoint meeting as a protest against the way arrangements had been made for the Veterinary Section.

It was the generally expressed feeling of those delegates who were present that it would be better if at future conferences the Veterinary Section were amalgamated with the Preventive Medicine Section. I understand that next year a joint conference of the Royal Institute of Public Health and the Royal Sanitary Institute is to be held. It would be to the benefit of the public if these two bodies, working on very similar lines, should be amalgamated, and it is to be hoped that this joint conference will be the means of permanently combining the two Societies.

On Tuesday two papers were taken, the first by Mr. Devine on "Bovine Tuberculosis and its Eradication," and Mr. James Gregg of Belfast on "How to prevent transmission of Tuberculosis to man through cow's milk." Mr. Gregg was not present to defend his paper ; the greater portion of the discussion which was well maintained was upon Mr. Devine's paper.

On Wednesday, July 22nd, Professor Penberthy gave a most interesting and entertaining Presidential Address. Mr. J. S. Lloyd read his paper on "The Qualifications of a Meat Inspector." The Secretary read Professor Woodruff's paper on "Anthrax and Glanders" ; also one by Mr. J. W. Brittlebank on "Cowsheds," but neither of these gentlemen were present.

The Local Secretary of the Veterinary Section, Mr. Geo. Howe, did his best for the delegates under circumstances of considerable difficulty.

The PRESIDENT : I am sure it will be in consonance with your wishes if I introduce to you in his official capacity as Treasurer of this Association, Mr. James Simpson of Maidenhead (Cheers).

Mr. J. F. SIMPSON : Mr. President, ladies and gentlemen, I acknowledge with very great gratitude the honour which you have conferred upon me by asking me to accept a position which was so worthily filled by our late friend, Mr. Wragg. I cannot hope to make myself as popular a Treasurer as he proved himself to be, nor can I claim that I shall be as successful as he was in performing the duties of the Treasurer, but I will do my best to collect for you the funds which are justly due to the Association. In this Association our funds does not permit us to invest our President with a chain and badge to denote the high position which he holds. With regard to the Secretary, we have not the power nor the money to buy him a key of office which will give him access to the important documents which are the property of this association ; but the Treasurer is always invested with a badge of office. I have been invested with that badge, gentlemen, unknown to you, unostentatiously, but very surely. This is my badge of office, the receipt book for subscriptions. I need hardly say that it is a new gift to the Treasurer when he takes office, and that it is mutilated by him as speedily as possible. I do not care how soon this badge of office is mutilated by me by tearing out half sheets and retaining counterfoils for the guidance of the auditors. I hope that will prove a hint to you, gentlemen—it is not necessary, I can assure you, for any of those who are present—that subscriptions will be welcomed by the Treasurer as soon as the members care to forward them to him. Again I thank you very much for the honour you have done me in accepting the recommendation of the Council that I should be your Treasurer for the coming year.

Mr. WILLIAM SHIPLEY : I beg to propose that the report of the Secretary and the balance-sheet be received and adopted.

Mr. F. L. GOOCH ; I beg to second that.

The resolution was put and carried unanimously.

PRESIDENTIAL ADDRESS.

Ladies and Gentlemen, in the first place I have to thank you for the great honour you have done me in electing me President of this Association. It is an honour I greatly appreciate, as this is the greatest of all our Veterinary Associations. All our Associations are, so to speak, represented in this one, and the meeting of this is the grand re-union of the year. Many a member meets at these meetings friends whom he does not see from year to year, and probably would not see for much longer periods were it not for the meeting of the National. Many a friendship has been formed at these meetings which will last as long as life itself. A great many of the best men in our profession from every part of Britain come to this Association's meetings, where much is to be gained from the interchange of thought and sympathy. I have always a great pity for those who keep themselves aloof from this and similar meetings. I think how much they lose of both knowledge and good friendship, for there is no one who has such a stock of knowledge that he could not add more to it, and if such a one be a Solon, how gladly would his professional brethren glean something from his store of wisdom. On the other hand, the good fellowship of such a one would be highly valued, and he in thus blessing others would himself be blessed. I like the National because it is a moveable meeting. By migrating North, South, East and West it keeps in touch with Societies and districts which otherwise might feel themselves cut off from professional intercourse. It also greatly benefits the profession by the labours of its members who are themselves specialists, or who are unusually well informed on the subjects they undertake to discuss. A great mass of most useful professional knowledge is thus brought to the immediate notice of members who might not, in the busy round of daily practice, have either time or inclination to get it first hand for themselves. And perhaps even this would not always be practicable, as is instanced this year in the papers on Cancer and Redwater, where the writers are devoting their lives to research, and readily give to the profession at first hand the results of their valuable labours. Quite a large number of subjects have been treated in that way during the last 25 years, and the corresponding benefit to the profession has been very great. Of one thing I am sure, namely, that the veterinary profession stands on a much higher level, socially, intellectually, and professionally, than it did 33 years ago. At that period the country was over-run with charlatans. Anyone could, without let or hindrance, style himself a veterinary surgeon. The herds of the country were terribly afflicted with pleuro-pneumonia; and foot-and-mouth disease was so constantly with us that many agriculturists thought it indigenous. Cattle plague had not long been eradicated from the country, while sheep scab was rife. Qualified men were scarce and sparsely placed in the country. In this way things went along till the passing of the Act of 1881. You will all remember the trouble, dissention and dis-union there was in the profession at the time of the passing of that Act. Now we are very glad that that Act was passed into law, and that we have the Veterinary Surgeons Act. For a time it was rather a bugbear to a great many of our professional brethren, because we were obliged to admit into the profession the Existing Practitioners, the Act having to be made retrospective. But the number of existing practitioners on the Register is gradually, although perhaps slowly, wearing down, and instead of having many hundreds of them, there are now only a few hundreds of them in existence. You will all see that in that way we have been greatly benefitted. When these men are removed, some in one way and some in another, room will be found for the educated men to step into their places. So the profession has become a united profession, and the country and Parliament look to us as the only educated body of men able to undertake these great duties and to give advice in cases of emergency that is so necessary for the well-being of the stock of the country.

We now have a staff of excellent men working at the Board of Agriculture, who from time to time are called upon at the very inception of disease to immediately stamp it out and prevent it making further inroads into the country. Recently we had such an instance at Edinburgh ; we have had many of these in the last 25 years. I think we can congratulate ourselves that we are now taking up the position which rightly belongs to us, and I hope that by all the means in our power we shall do all we can to retain the high confidence which is reposed in us.

But, gentlemen, we are again faced with another trouble in the Bill which is before us, and also before the Privy Council, and which we hope shortly will be passed into law : I refer to the Veterinary Surgeons Act—(cheers)—the principal feature of which has for its object the elevation of the profession. It aims at making the standard of the profession higher, so that we may place ourselves higher in public opinion ; it aims at putting us, by means of our wealth, in an unassailable position ; it aims at introducing higher education, the establishment of a good Library and a good Museum, and it also aims at having our interests watched in a very efficient way as they come before Parliament, so that nothing will be passed of which we disapprove without the utmost endeavours being made on our behalf to prevent such a Bill being passed. Those are some few of the great objects that the leaders of our profession have before them in trying to pass the Veterinary Surgeons Act of 1908. Gentlemen, I most sincerely wish every success to those who are working in that direction, and I am only sorry that again, as before, we have opposition, and that the opposition comes from within the ranks of the profession (Hear, hear). I hope with all my heart that that opposition will soon be removed (Hear, hear), and that the great and beneficent objects we have in view will be carried to a successful conclusion (Cheers).

Then, gentlemen, there is another thing which I think we must keep our eye upon, and that is the passing into law, as we hope will very speedily be done, of the Tuberculosis Bill and also the Milk Shops and Dairies Bill. I understand that will be brought into Parliament in one big Bill. We might have wished that it could have been brought in in two separate Bills. Personally I think the eradication of tuberculosis from the herds of our country is really the beginning of the eradication of tuberculosis from the great human family in this land of ours. How devoutly everybody must hope for the consummation of that great object. If the eradication of tuberculosis in our herds were placed under the supervision of the Board of Agriculture, I cannot help thinking it would be much more efficiently dealt with than it possibly can be by any other Board, and especially by a Board which has no veterinary organisation for the carrying out of such a great work. I am one of those who hold that the time is not yet too late for the matter to be placed in the hands of the Board of Agriculture, and not in the hands of the Board of Trade, or the Board of Health, or some other Board, that does not know anything about the question, and which has no organisation whatever for at once taking up the great work which will devolve upon it. I also think that the inspection of milk and meat and cow-sheds will have to be put on such a footing that they can be dealt with by the veterinary profession in this country, because I am quite sure that no body of men is so thoroughly equipped and so well able to deal with this great matter of tuberculosis in our herds as is the veterinary profession (Cheers). As you know, they are most thoroughly equipped as veterinarians to deal with this matter, and if they do not possess the necessary knowledge we may well ask ourselves, then who on earth does? There is no other body of men which possesses the necessary knowledge for the extirpation of this disease from our land as does the veterinary profession, and that is the great reason why the subject should be placed in our hands, and why we should have the dealing with this great matter, which is of such paramount importance to us as a race and to the valuable animals that inhabit this land of ours—a land from which our cattle are sent to every corner of the earth.

I do not think I have anything more to say at this moment; except that I do most sincerly hope you will all have a very enjoyable visit to Brighton. It is a lovely place, London-by-the-Sea, and the Southern Counties have laid themselves out to make you as happy as they possibly can during your stay here. I hope you will, therefore, take full advantage of the efforts that have been made for your comfort during your stay in Brighton (Cheers).

We now proceed to the real business of the morning, which is the discussion on Dr. Murray's paper on "Cancer in Animals." I am glad to say that Dr. Murray is here (Cheers). I shall be very glad if some gentleman will initiate the discussion on the paper.

NOTES ON THE ORGAN-INCIDENCE OF CANCER IN DOMESTICATED ANIMALS.

By J. A. Murray, M.D.
Imperial Cancer Research Fund Laboratories.

The study of cancer presents at the present day two directions which are not yet exhausted: the experimental study of malignant new growths, and the statistical investigation of the incidence of the disease. The histological analysis of cases of spontaneous cancer has apparently reached a natural end, and as was strikingly exhibited at the German Pathological Congress at Kiel this year, eagerly grasps at the tentative conclusions of experimental investigations to obtain new points of view. In the future the histological study of spontaneous cancer must more and more be limited to furnishing the crude data for statistical enquiries of various kinds.

In these circumstances what are the points of attack to which it is profitable to direct the attention of the veterinary profession with most prospect of furthering the solution of the essential problems of cancer, from a knowledge of which alone a rational treatment of malignant disease is to be expected?

It would be idle to propose an extension of the experimental study of cancer to the larger domesticated mammals as a profitable line of investigation. For the time being, the experimental study of cancer must be carried on in institutions specially devoted to it, by means of investigations on the malignant new growths of small mammals, and particularly of the mouse and rat. These investigations are costly both in time and money, and will probably become still more exacting in both respects in the near future.

The statistical investigation of cancer, on the other hand, is in dire need of the comparative control which an extended knowledge of the incidence of malignant new growths in the most divergent animal forms alone can give. The importance of accurate information as to the different histological types of cancer met with in different animals, and their relative frequency in different organs, is only now beginning to be appreciated. It is not so many years since the view was widely held that true malignant new growths did not occur except in the human race, and that the conditions identified as cancer in the domesticated mammals were in reality totally distinct, pathologically and clinically, from cancer as it occurs in man. Sir John M'Fadyean entered an energetic protest against this view, and showed that all the histological types of malignant new growths familiar to the student of human pathology were already recognised in several of the domesticated mammals, and particularly in the dog and horse.

Bashford and I were able to confirm and familiarise these conclusions at the Imperial Cancer Research Fund Laboratories, on the basis of material which we owe entirely to the generous and ungrudging collaboration of the veterinary profession of this country.

In spite of these facts it cannot be denied that the records of the occurrence of malignant new growths in the domesticated mammals is still regarded with a healthy scepticism by several writers on human pathology. It is especially with reference to the clinical course of the disease that the differences between cancer as it occurs in man, and as it occurs in other mammals seems to give rise to misgivings.

This is an attitude with which I must confess I have little sympathy. To anyone trained in the comparative method, these differences even when slight are of the highest interest, and it is difficult to comprehend on what general grounds it is incumbent on us to expect that all the mammals must conform in their biology exactly to the processes which have been observed in man. The practical identity of cancer in all its essential features throughout the vertebrates is all the more striking, and lends added importance to its comparative study.

Until recently the statistical investigation of cancer has been carried out along two independent lines. The statisticians have analysed the quota which malignant disease contributes to the general mortality of this and other countries, and have devised elaborate methods of actuarial correction, in order that comparisons may be made between the cancer mortality of different districts and countries, and between the records of the same country at different times. The clinicians and pathologists, on the other hand, have mainly concerned themselves with the relative frequency of cancer in the separate organs of the body, and when they have attempted to extend their conclusions to the incidence of the disease in the general population, have generally come to grief through ignorance, or neglect of the actuarial corrections that are necessary.

In the last report of the Registrar-general for England and Wales the two methods have been combined for the first time. Dr. Tatham has compiled a table showing the proportion contributed by the several organs of the body to 10,000 deaths from cancer in the general population. This is one of the most valuable results which have ensued from the method devised in consultation with Dr. Bashford, of recording the cancer mortality of the country with reference to the site of the disease, instead of in accordance with the clinical diagnosis. When Dr. Tatham's figures are compared with those obtained from hospitals, although the fact of varying frequency in the incidence of cancer on different organs is confirmed, the actual figures do not correspond closely. Thus, whereas cancer of the uterus is a more frequent *cause of death* than cancer of the breast, cancer of the breast is more frequent than cancer of the uterus as a *cause of admission to hospital.* Again cancer of the penis and testis are relatively twice as frequent in hospital cancer cases than in the mortality returns, and cancer of the lip is three times as frequent in 10,000 cases of cancer in hospitals than in the same number of deaths from cancer. There can be no doubt that a certain proportion of the cases operated upon recover completely, or die of intercurrent disease without recurrence. It is probable, however, that, *e.g.*, in the case of cancer of the uterus, a larger proportion of the cases are recognised at too late a stage in the disease, than is the case in cancer of the breast. This same factor of easy early recognition will obviously affect the relative proportion, say of cancer cases of the lip or tongue and stomach, brought to hospital.

When we attempt to construct corresponding tables of the "organ-incidence" of cancer in the domesticated mammals, we recognise at once that a comparison with the mortality figures of the Registrar-General is out of the question. The preliminary data of total animal population, for example, of dogs or horses, are not obtainable, and still less is it possible to arrive at an estimation of the actual numbers of any one species of the same age or "age-constitution." Furthermore, the proportion of the two sexes in, *e.g.*, the total number of dogs in the country, is determined by other considerations than the numbers born. The death of domesticated animals also, is frequently not a natural one, and we must content ourselves with an analysis of the cases which present themselves for treatment or come to necropsy. Hence the relative liability of the several domesticated mammals to cancer cannot be compared. It is true that more cases are recorded from the dog and horse than from the cat, cow, pig, and sheep. The large proportion of cases from the cow in our material is entirely due to the extensive series of growths in this animal discovered by Mr. Trotter and generously brought to our notice by him. Very little reflection will convince anyone that the crude figures of total numbers of cases have a very slight value as indications of real variations. The general consideration that the numbers of each species from which the recorded cases are drawn, vary widely, shows that the number of cases can only by hazard indicate the relative frequency. In the case of the dog especially, the number of aged animals is greater as compared with the total number alive than is the case with any other domesticated animal. This is a natural consequence of the close personal interest which dogs excite and respond to in this country. Since malignant new growths increase in frequency with advancing age, it is inevitable that a large number of cases should be recorded from the dog, an animal which is prized more highly in proportion to the length of time it has been kept. In addition, dogs are as a rule so docile and obedient that a thorough physical examination is easily carried out. The influence of both these factors, and particularly the latter, is probably responsible for the relatively small number of new growths obtained from the cat. Cats, especially when in ill-health, are not convenient animals to examine, nor is there the same desire to prolong their life when the accidents or concomitants of old age begin to impair their general health.

The horse is kept to an advanced age and is easily examined, whereas the cow in this country is fattened as soon as the reproductive powers begin to wane, and is slaughtered for food. Mr. Trotter has pointed out how an overwhelming proportion of his cases of malignant adenoma of the liver, and cancer of the stomach, adrenal, etc., were obtained from extremely old Irish cows, the cow being kept for draught purposes in Ireland. The rarity of cancer in the pig is probably to be explained from similar considerations, only a very small proportion of the animals bred being allowed to attain late adult age.

Up to the present we have obtained specimens of 64 cases of cancer from the dog, 12 from the cat, 16 from the horse, and 34 from the cow. While in the dog and cat one quarter of the tumours were situated in the mamma, only one of the 34 cases from the cow had attacked this organ, and in the horse no case has yet come to our notice. The only case of cancer of the uterus is from a cow, although several cases of carcinoma of the vagina and vulva have been obtained from the horse and cow. Fourteen sarcomata of the fore and hind legs of the dog out of a total of 64 tumours again seems a very high proportion not encountered in the other animals, and the frequency of carcinoma of the liver in cows (9 out of 34 cases) is also unique. In view of the small numbers, these figures act more in whetting the appetite than by satisfying our desire for knowledge. The case of cancer of the mamma, for instance, tempts one to the reflection that its greater frequency in the dog and cat may be due to the artificial interruption to lactation that so frequently ensues on the violent death of their offspring at a tender age. Its occurrence in male dogs and its relatively still greater frequency in the mouse, however, in which this factor is conspicuously absent, indicate the necessity for caution in applying such considerations. Primary carcinoma of the liver in man is almost invariably associated with cirrhosis of that organ, but I have not been able to convince myself of such an association in the cases from the cow which I have examined. Carcinoma of the eyelids in horses and cattle very frequently takes its origin in the caruncula, or vestigial nictitating membrane. Loeb noticed its frequency in this situation many years ago in the cattle of the ranches in the Western States of North America, and spoke of its endemic occurrence.

The ascertained facts of the differences which subsist between the different races of mankind with respect to the relative frequency of cancer in different organs of the body, show how fallacious our conclusions may be as to endemic foci or epidemic occurrence of cancer. In Ceylon nine-tenths of all cases of cancer are situated in or around the mouth. This is associated with the custom of the

Singalhese of both sexes of chewing a mixture of betel-nut, slaked lime and tobacco. They even sleep with the plug in the mouth, and the maligant new growth develops at the exact point where the irritant is most constantly applied. In the same way the natives of Kashmir suffer to an exceptional extent from carcinoma of the anterior abdominal wall. This takes its origin in the patches of chronic dermatitis caused by the heat of a small charcoal stove carried under the clothes to maintain the body temperature. The asociation of cancer with these peculiar forms of chronic irritation is analogous to that of cancer of the scrotum with the occupation of chimney-sweeper or of paraffin-worker. An analogous association is seen in the case of cancer of the hands and forearms in aniline workers. No one has as yet propounded the view that cancer is endemic in paraffin oil works, or among chimney-sweeps.

In the domesticated mammals the same association with local chronic irritation is met with in the brand-cancer of cattle, and "horn-core," which is an epithelioma of the base of the horn in Indian cattle, and always attacks the horn to which the trace is attached in draught animals.

The great variety of the forms of chronic irritation which appear to elicit cancerous proliferation shows that the chronic irritation is not the immediate cause of the new growth. It merely sets up changes in the tissues, on which, as a further cellular transformation, cancer begins. It is probable, however, that a systematic study of cancer in domesticated animals will furnish other equally striking associations of the origin of malignant new growths with chronic irritation. To further the accumulation of evidence on this point it is essential that specimens of new growths from animals should consist of slices taken through the growth and the adjoining normal tissues at right angles to the junction between them. Fragments from the growth itself without the surrounding tissues are of very limited value. As in the past, the Imperial Cancer Research Fund is desirous of accumulating material of this kind, and we are deeply grateful to those members of the veterinary profession who have assisted and still continue to assist us in this manner. The suggestion is, however, worthy of consideration whether the Veterinary Association might not with advantage undertake the systematic compilation of statistics on the "organ-incidence" of malignant new growths in the domesticated animals.

When the cases in man and animals in which the association with peculiar forms of chronic irritation is clear are put on one side, the remainder, comprising the majority of the cases, cannot be traced to any such agency.

The liability of grey horses to melanotic new growths has been frequently noted. They also occur in horses of other colour and frequently remain circumscribed for a long time. Hence the opinion has been expressed that they are essentially benign tumours but they may recur after apparently complete extirpation, and may produce metastases. I am inclined to regard the greater liability of grey horses to this form of growth as associated with the early degeneration of their pigmented cells. This is a normal alteration analogous to the whitening of the hair in man and animals with advancing age, and merely commences in greys at an earlier age. It may in fact be regarded as a precocious senescence of one tissue, and takes place by a cellular degeneration in which the nuclei of the pigment cells become smaller and their chromatin forms large clumps instead of a fine reticulum. At the same time the brown pigment granules coalesce to form larger masses, and ultimately a small aggregation of three or four mutually flattened masses of pigment is all that remains of the cell. These are then taken up by phagocytes and transported to the lymph glands, so that in aged grey horses the whole lymphatic system, vessels and glands, is mapped out by the contained black pigment.

This early senescence of the pigment cells usually runs an uneventful course, and it is only in a relatively small proportion that the process of involution is modified by the intrusion of malignant growth. This most usually involves the subcutaneous pigment at the root of the tail or in the neighbourhood of the external genital organs, in which situations the pigment usually is best retained, even in advanced age. Whether the slowness of the involution process, or associated chronic irritation, is an important factor in initiating the cancerous transformation in this situation is difficult to determine, and might repay further study.

In another direction our investigations are largely dependent on the assistance and goodwill of veterinarians. This is in the matter of obtaining live animals suffering from spontaneous cancer. There are financial and other limits to the number of such cases in the horse and in cattle which it is possible to investigate, and in the case of the dog and cat sentimental considerations, which must be reckoned with, diminish the opportunities which might otherwise be available for objective study. As far as can be seen at present, neither of these considerations have such weight in the case of the fowl, which would in many respects furnish an ideal material for experimental study. Although the number of cases of cancer which have been recorded in birds is still small, this is probably to a large extent due to the absence of careful investigation and to the frequency of infective granulomata, especially tubercle. In any case we would particularly recommend our necessities in this direction to the notice of the veterinary profession, with the confidence born of past experience of an invaluable collaboration.

DISCUSSION.

Mr. F. HOBDAY: Mr. President and gentlemen,—It is with some diffidence that I respond to the request of the President to open the discussion on this important subject, because I think the opener of the discussion on a paper like this should have had plenty of warning and should have been fully prepared; and if that had been the case he would have been able to give you a very much better opening than I shall be able to do.

The importance of the organ-incidence of cancer, or indeed of the whole subject of cancer in the domesticated animals, viewed not merely from the organ incidence but from the clinical aspect, is one which appeals to every member of our profession. All of us in practice meet at some time in our lives with cases of cancer. We know the incurability of it. We know in pet animals particularly what great distress it causes to the owners, whether it be a favourite horse or favourite dog, particularly the latter; and we know how utterly helpless we are to do anything more than to advise painless destruction. The comparative aspect of the study of cancer is one of the greatest importance, and it is of the greatest importance to us not merely from the point of view of our own patients, but it is also beginning to be recognised, indeed is already recognised by the broader-minded, leading members of the sister profession, that they must obtain an enormous amount of knowledge which cannot be obtained in any other way than by the assistance of the veterinary profession, or by experimental work on what we may legitimately term our patients. There is no other way in which certain knowledge can be obtained, and for that, if for no other reason, the comparative aspect of the question of cancer is one which must appeal to all of us.

Dr. Murray says in his paper that "It is not so many years since the view was widely held that true malignant new growths did not occur except in the human race." I think we shall differ a little from him in that respect, or at all events we shall want to know exactly what he means by "not so many years," for I am sure that for the last fifteen years, at any rate, the members of the veterinary profession have recognised that true malignant new growths, and even carcinoma, do occur very frequently in animals, in fact much more frequently than we like to think about, particularly if one takes the words "true malignant new growth" as they are written here. Even if we did not always say that the animal had cancer, we used to say it had a tumour of a cancerous nature, which probably meant either carcinoma or cancer, carcinoma being much more common in animals than cancer itself. But as years have progressed, and in view of the fact that during the last few years Cancer Research Fund Laboratories have been erected in different parts of the country, it seems astonishing to read a little further in the paper that there is still a healthy scepticism by several writers on human pathology as to whether malignant new growths occur in the domesticated animals or not. I am rather surprised to read on page 24 of Dr. Murray's paper that " Up to the present we have obtained specimens of only sixty-four cases of cancer from the dog, twelve from the cat, sixteen from the horse, and thirty-four from the cow." I think it reflects very much on us as a profession that we have not taken sufficient interest to forward to one or other of these Cancer Research Laboratories the specimens as we have met with them in our daily lives, because I am quite sure that all of us do meet with quite a large number of malignant new growths in animals every year. Personally I remember in one year, the first year the Cancer Research Laboratory was started, or the second year—I forget which—when the subject was brought on numerous occasions before the veterinary profession, I had no less than eight cases in about ten months in the dog and cat alone, and one other case which I saw, which was not in my own practice, in a mare. I have not seen so large a number in such a small time since, but each year since particular interest was drawn to the subject, distinct cancer cases have occurred which I have been careful to get Sir John M'Fadyean or Dr. Murray to confirm. The specimens have always been sent up to them.

Attention is drawn to the fact, on the top of page 22 and also on page 24, that these malignant new growths—I presume Dr. Murray means carcinoma principally—are especially met with in the dog and the horse. That I think is a point which is well worthy of discussion to-day. There is no doubt that cancer is a disease of old age, and there is no doubt, too, that the reason we so frequently see cancer in the dog and horse as compared with other animals is that the dog and horse are animals which are allowed to live to old age. You will see in the paper that a number of cases are met with in the cow. Some cows are of course allowed to live to what is to them a comparatively old age, but the horse, dog, and cat are animals which are allowed to live as long as they will in many cases, and cancer is much more frequently met with in them than in the pig, sheep and other animals.

Attention is drawn in the paper to the fact that in the human being " Cancer of the uterus is a more frequent cause of death than cancer of the breast, and cancer of the breast is more frequent than cancer of the uterus as a cause of admission to hospital." That is a point which is well worth drawing attention to, and the reason for it I feel sure is, as is hinted here, that cancer of the breast is a disease which is seen, and therefore notice is drawn to it, whereas cancer of the uterus is not seen until certain pains cause attention to be drawn to the fact, and by that time it has made a large amount of progress. With regard to cancer of the uterus in animals, I see it is mentioned that a case has been noted in a cow; but so far as my own experience is concerned—I have watched the point very carefully in smaller animals—cancer of the uterus in animals is a comparatively rare disease, in fact a very rare disease.

Then Dr. Murray draws attention to the irritation theory. It is very interesting to see that this theory of irritation holds good in man as well as in animals. Undoubtedly in animals this irritation theory is one which has to be seriously considered. The greater proportion of cases in the dog and cat occur either in the throat, or the oesophagus, or the mamma, particularly in the throat and the mamma. These are places in which there is always a very large amount of irritation. In a large canine practice, the first thing one does when an animal is brought in not feeding, especially if not salivating, and the owner says he has a peculiar haggard expression, is to examine the tonsils, and it is astonishing in what a large proportion of cases one finds jagged tonsils, which usually prove on examination to be carcinomatous. By a fortunate coincidence, I happened on only Thursday last to have an aged cat belonging to a medical man brought in, with a history that it had a huge swelling on the side of the throat, which at the time I took to be tuberculous of some kind. It was lanced, and I found there was a lot of fluid in connection with it. On examining the fluid I found it was a distinct case of carcinoma. A specimen was sent to Dr. Murray yesterday; he has since examined it, and has brought the specimen down here to show you. It is quite a typical case of carcinoma as it occurs in the dog and cat. Then Dr. Murray says, "The case of cancer of the mamma, for instance, tempts one to the reflection that its greater frequency in the dog and cat may be due to the artificial interruption to lactation that so frequently ensues on the violent death of their offspring at a tender age." That rather points again to the theory of irritation. I am sure this theory of irritation, although it may have something to do with it, is not altogether the cause of cancer, because if it were so one would expect to get cancer in the mamma of the cat. The cat is an animal which has its offspring destroyed practically as soon as they are born. In the majority of instances no care is taken to leave a kitten to take away the milk, and it is therefore certain that this interruption to lactation is not the only cause. It may be one of the causes but it is not the only cause or we should always be having cancer in the mamma of the cat. Cancer of the mamma of the cat is not a very common thing, although thousands and tens of thousands of cats have their kittens drowned as soon as they are born.

Then Dr. Murray says, "Carcinoma of the eyelids in horses and cattle very frequently takes its origin in the caruncula, or vestigial nictitating membrane." I think it may also be said that the eyeball, or rather the tissues at the back of the eyeball, are frequently the originating centre of carcinoma, for I know of several instances where the origin has apparently been at the back of the eyeball and where the whole eyeball has been destroyed, both in the cow and the horse. I see no mention either of carcinoma of the sinuses of the horse. That is generally admitted to be one of the commonest seats of carcinoma in the horse,

I do not quite agree with Dr. Murray where he says in a paragraph on page 25, "When the cases in man and animals in which the association with peculiar forms of chronic irritation is clear are put on one side, the remainder, comprising the majority of the cases, cannot be traced to any such agency." Certainly as far as my own experience is concerned—I speak of between twenty and thirty cases—the majority of instances have always been in some part or other of the body where the parts have been continually irritated. Dr. Murray has omitted to mention that even the fish is affected with carcinoma, and, we, as veterinary surgeons, ought to be particularly proud of the fact that this discovery was made by one of of our scientists, who was the first to observe and record it—I refer to Dr. Gilruth of New Zealand, the pathologist of the New Zealand Medical Board of Health. He was the first to demonstrate its presence in a trout, and since then it has been recorded on several occasions.

I was a little disappointed on reading the essay through to find the essayist had not been a little more specific as to the actual organs affected, and as to the actual order in which they were affected. It would have been a little more of a guide for future work if the organ incidence had been tabulated a little more explicitly, and perhaps in his reply the author will give a little thought to that point.

One point in connection with cancer research work has certainly been cleared up, or rather it has given room for further thought, namely, that the illusive bacillus which is supposed to be the origin of pretty nearly every disease is supposed not to be present in cases of carcinoma. The apparent non-contagiousness of the disease seems to show it is not due to that bacillus. It may be that our methods of microscopical research will be improved to show some thing which will put us on the track, not only of this disease, but of several of those other diseases which are said to be due to invisible organisms.

Lastly, I should very much have liked the essayist to have given us some hints as to whether there is any prospect at the present time of a cure for this disease, or any method by which in the primary stages, except by surgical interference, we can hope that in animals as well as man we may have a cure for it. I hope he will give us a hint in his reply with regard to that. In the study of cancer itself, we practitioners of comparative medicine must in the future do our share, even more than we have done in the past. The clinical aspect is quite as important as the laboratory aspect, and it is only by sending to men like Dr. Murray, Sir John M'Fadyean, and others who have laboratories, and who have devoted particular attention to the question of cancer research, that both they can be helped and that we too may hope for help in the future in the treatment or cure of this most horrible disease. They are never tired of receiving specimens from us; the only cry is that they cannot get enough, and as you know they are always willing to give opinions as to whether a particular case is cancer or not, opinions which are of value to us, to our patients and to our clients. If it is possible, as stated in the paper, to send specimens alive, so much the better; if for sentimental or other reasons it is not possible to send the specimens alive, then it is asked that we should send them as fresh as possible in some preservative. It is only in this way that we can hope to do our part in furthering the study of any disease, and in this particular instance one of the most horrible diseases to which both men and animals are liable.

Prof. G. H. Wooldridge: I must confess, in the first place, the very great disappointment I experienced when I first read the paper. I had been looking forward to learning a considerable amount from the paper which was to be presented to us by one of those responsible for the work at the Cancer Research Fund Laboratories, and when I read through the paper I must say that I got very little information indeed from it. It seemed to me to be a paper written with a view to stimulating observation and the recording of cases on the part of veterinary surgeons, which of course is a very laudable object; but at the same time I think before we can be well stimulated to do that we must be given something to interest us. We want to know that there is good work going on; we believe there is, but we want to know something about it; and here was a splendid opportunity for Dr. Murray or Dr. Bashford to give us a little interest in that direction. Nevertheless, I think the Association is very much indebted to Dr. Murray for coming forward in the way he has done to fill the gap which was made by Dr. Bashford's inability; and I am disposed to think it is only on account of the short notice that Dr. Murray had that the paper presents the deficiencies I have just mentioned. There are a great number of points referred to in the paper, which we might discuss. In the first place, I wish to say that in reading the paper through I notice there is an inaccuracy, if I may put it in that way, with reference to the explanation of the occurrence of cancer in cows in Ireland. We are told that it is due to the cow being kept for draught purposes in Ireland. I may say that, although I have lived in Ireland some few years, I never saw cattle being used for draught purposes in that country, but I have frequently seen them in England. So that whatever the explanation may be, we shall have to look for another one and not adopt that. The title of the paper would, I think, have suggested to us that Dr. Murray might have given us a little more detailed information with regard to the causes of cancer in the domesticated animals that the Laboratories have received. They have received 126 specimens, and Dr. Murray tells us practically nothing about where they occurred, or what they were, or anything else in regard to them. The only thing we are told about the question is that in nine out of thirty-four cases of cattle it occurred in the liver. We do not know anything about the remaining twenty-five, as to whether they were carcinoma or sarcoma, or whether they occurred in the uterus, or whether they occurred round the "horn-cores," or whether they were in any place that we might have reasonably considered to be due to their being used for draught purposes. The same thing applies to the dog cases. There are sixty-four cases of cancer from the dog mentioned, and the only thing we are told about them is that in about a quarter of them the tumours were situated in the mamma. I do not think, so far as the organ-incidence is concerned, that is sufficient detail at all. Then Dr. Murray has absolutely ignored any other records of cases that have occured in the domesticated animals, and which have been recorded with perfect authenticity. A number of veterinary pathologists have been recording cases regularly. Those cases are certainly authentic, and might have been referred to as far as the statistics are concerned, because the paper deals largely with the advisability of obtaining statistics. We have had no statistics at all given to us. Dr. Murray by advising that we should obtain statistics cuts the ground from under his own feet by saying that statistics are practically useless on account of the difficulties we have in connection with the domesticated animals, so many of them being killed. Of course the only point we could gain from the statistics in this case would be the relative occurrence in domesticated animals of the records of cases; it would not necessarily mean the proportion of animals affected. We should only see how frequent carcinoma was in comparison with sarcoma or the other varieties of tumour.

There are a number of cases that have recently come under my observation which may be of interest from this same point of view. In the horse I have recently met with quite a number of cases of carcinoma, and certainly more frequently carcinoma than any other variety of tumour. That may be only due to the fact that we frequently do get cases coming altogether of one variety, and then perhaps for the next few years we may meet very few of the same kind of cases. They seem to come in runs. But of these very recent cases the majority appear to have occurred about the head of the horse. One case occurred in the superior maxilla, penetrated the sinuses of the skull, and was very extensive on both sides of the head. Two others occurred in the nostrils, and the growths extended up into the nasal chamber. Two occurred in the orbit, the origin of them apparently being some portion of the eyelid, but they were so extensive at the time they came before me that it was quite impossible to say in which part of the orbit they had arisen. The vulva is not at all an uncommon site. I recently met with a case of carcinoma of the vulva of the horse. Carcinoma of the penis again appears to be not uncommon. During the last six months I have had two cases of carcinoma of the penis of the horse, and a third case which I operated upon last week, which I thought by clinical examination at first was affecting the penis, and which I eventually found out was not, but which affected the sheath itself. It was very extensive; it extended the whole of the way round the opening of the sheath and completely embraced the penis. On examining the growth clinically, I was able to trace along some hard tissue, which appeared to be embedded in the penis itself. I told the owner in the first place that I did not anticipate good results, and that the thing would probably recur; and as the horse was of no value, probably the best thing to do was to have it slaughtered. He said that he would have an operation performed and that he would take the risk. So I attempted to excise it. I then to my surprise found that the penis itself was absolutely healthy, that the growth extended all round the sheath, and two long threads of it up towards the two inguinal regions.

Papillomata are very common in the horse, both with regard to the sheath and the under-surface of the body. Fibromas are also the same. Dr. Murray refers to the presence of melanoma in grey horses. I had an interesting case only a fortnight ago of melanoma in the mammary gland of a grey horse. It was very well circumscribed. I excised it, and it weighed 4½ lbs. On making microscopic examinations of it, I found it was just what we commonly call melanoma and not either carcinoma or sarcoma. What we call melanoma is simply collections of melanin in a fibrous tissue matrix.

Recently I have also met with three cases of cancer in the cow, and curiously enough in each instance it originated in the orbit. The first was a very interesting one. Quite a white or pinkish-white growth was seen on the front of the eyeball, and on examination it appeared to be limited to the front of the eyeball—the cornea. I imagined that by removing the eyeball in all probability I should not get a recurrence. At the time I was not at all satisfied as to the nature of the growth, so I removed the eyeball, and on microscopical examination it was found to be a typical cancer, carcinoma, with the nest cells. It was a very nice specimen. I told the owner that I expected the cow would go on alright, so that I was very much surprised about six months afterwards to be informed that the socket, as the owner called it, was filled up with a tumour, and on examining it again I found that such was the case. Again I removed the growth, scraped out the orbit very thoroughly, removed all the tissues that I could find in any way affected, and sutured the eye-lids together. The whole thing healed up, and she appeared to be doing perfectly well. In another six months, however, a swelling appeared in the region of the pharynx, and on my informing the owner that in all probability it was a recurrence of the growth in the glands, he said he would consider the matter, and I learned a few weeks afterwards that he had sent it to the abattoir. So that, unfortunately, I was unable to find whether it was an invasion of the glands by the carcinoma, which I expected it to be. The other two cases which occurred were round the margin of the orbit; they had impinged on the orbital cavity, and had destroyed the eyeball in each case. The prevalence of sarcoma in dogs as compared with other varieties of tumours is rather remarkable, as Dr, Murray has pointed out, and I should like to know if there is any possible explanation of that point. A number of them, however, appear to be of the less malignant form of sarcoma, the spindle cell rather than the round cell variety. Most of the cases that I have met with occur similarly to Dr. Murray's records, principally in either the fore or hind legs. In a case that came before my notice of a pug dog, it affected the neck of the dog.

While referring to sarcomata in the dog, I should like to ask for some information with regard to the so-called infective sarcomata, or infective granulomata of dogs that occurs frequently in the vagina. I am not quite sure as to where we should place these cases. Undoubtedly they are infective, but they are not very malignant, because in many cases if you excise them they go on perfectly well and rarely recur. The same point arises in connection with infective papillomata of the dog, which are not at all uncommon. I had a case last week in which the mouth of the dog was the seat of a considerable number of papillomata. The dog also had a number of papillomata about the groin, the inside of the thigh, and the under surface of the body. He had been biting them, and there appeared to be infection from the skin to the mouth. It is the only case in which I have been able to observe this occurrence. I would like to know whether Dr. Murray would consider it rather a coincidence or a matter of infection.

One point arises in this connection which is of great importance I think to veterinarians. Another dog that was brought to me the same day had a number of these infective papillomata of the nose. The dog was to be exported to Australia, but before he could be exported he had to be armed with a certificate by a veterinary inspector that he was free from infectious disease. I should like to know what any inspectors present would do under such circumstances. We know that these things are infective; we know that we transmit them from one dog to another experimentally, although they do not usually last very long, and eventually disappear spontaneously. But what is the position of the veterinary inspector in such a case? Would he be justified in giving that dog a certificate that he was free from contagious disease, or would the dog under the circumstances have to be held back? I should like to support Dr. Murray's appeal for more material with regard to these cancers of the lower animals. Cancer of the lower animals is very similar to that of the human being—if it is not identical; and we never know, in research for the clue as to the cause, which particular specimen is going to provide it; so that I think we should all assist in the best way we possibly can in this direction.

Mr. E. L. Dixson, (Margate): As a private practitioner with a mixed practice I should like to record my experience of cancerous growths in domesticated animals. My finding is that it predominates largely in dogs, next in cattle, and thirdly in horses. I have had cases of carcinoma of the orbit in cattle, on which I have operated and removed the eye, but in each case there has been a recurrence of the growth. In dogs I have found the growths principally in the throat. I had a case at the beginning of the present year of a sarcoma situated on the posterior part of the thigh, on which I operated. There was subsequently a re-formation of the growth. The dog, a fox terrier, was a great favourite of its owner on account of its being a favourite of his deceased wife; and after the growth recurred a second time he called in two eminent surgeons, in addition to an anæsthetist, to remove the growth. They performed an operation, but again there was a re-formation of the growth, so that there was not only failure on my part, but failure on the part of the two doctors. He called me in again on Sunday last, and he decided upon my advice to have the dog chloroformed yesterday morning, and I had hoped that I should have been able to bring the leg here to-day to show you, for the growth had extended considerably up the hip. But at the last moment my client's heart failed him, and he said he could not part with his old favonrite, and he asked me to keep it for another week. The dog will be destroyed at the latter end of this week, and with Dr. Murray's permission I shall be very pleased to forward the specimen to him.

Mr. W. Hunting: Although I am quite unable to contribute anything in the way of information on this paper, I want first of all to thank Dr. Murray for writing it for us at such short notice, and I want to suggest to two of the speakers that there may be some reason for Dr. Murray's not having given us a great deal of information. I would mildly suggest that he had not much to give, that there is not much known about the subject, and that all the work they are doing in the laboratories involves an immense amount of labour, so that it will still take some time before Dr. Murray is able to give us that sort of definite information which the clinician requires. I should be sorry to ask him, as one gentleman did, to give us a cure for it. We are a long way off that yet. What I really got up for was to thank Dr. Murray for having given the veterinary profession such a good show. There are three subjects or divisions into which you may separate the paper; the organ-incidence of the disease; prevalence in domestic animals; and a reference to inoculation experiments. The organ-incidence was worked out by Trotter; the correction of the prevailing opinion about its prevalence in domesticated animals was pointed out by Sir John M'Fadyean; and the only inoculation experiments that have been any good are those done by Jensen—all three of them veterinary surgeons. I think it is encouraging to point that out; and if we would only report our cases as well as send them up to pathological centres, such as the Royal Veterinary College, or the Cancer Research Fund Laboratories we will surely do a lot of good. There is not a man in the room who does not see a case of cancer in some animal every year of his practice. I took the trouble to turn up the first ten volumes of the "Veterinary Journal" before I left home, and I found there were only three references to cancer in the whole of the volumes. That does not give us a chance, and does not show what we know clinically about it. Analyses connected with pathology, chemistry, physiology and experimental work are useful, and although you may not see the value of the results at the time, the time comes in which those results will be of value, and if we only record our clinical cases, exactly the same thing applies. Although we may not see at the time any particular value in the record of a solitary case, yet when they are taken in bulk by such men as Dr. Murray, they will be of extreme value in affording general information.

Mr. R. HUGHES (Oswestry): After what Mr. Hunting has said, I must apologise for not reporting my cases, and at the same time express gratitude to Dr. Murray for coming forward and presenting us with his paper. When I read it at first I felt disappointed that it did not contain that information which we expected with regard to the pathology of the subject. During one year in my practice I had three cases of cancer, two in the mare and one the cow. It is undoubtedly a disease associated *with outdoor life*, and in each case it was connected with the vulva. Being closely associated with the Cancer Research Department in Liverpool, I naturally sent my cases there. The first one was that of a roan mare. She was eighteen years old, and had a growth in the lower commissure of the vulva, which was removed under cocaine. There was a recurrence of it in about five months. I secured the animal for the Cancer Research Department at Liverpool and sent her there, and they found it was a typical case of carcinoma. They kept the mare for some time, and found there was a recurrence. The other, a cow, was affected in the same part, the lower commissure of the vulva. It was removed, but it recurred. The owner was a well-to-do gentleman, and I asked him to give me the cow in order that I might send it to the Cancer Research Laboratory. He did so, and the cow was kept at the Laboratory for ten months, and she enjoyed good health. That cow had had six calves. The third case was that of a mare suffering from carcinoma of the same part. I did not treat her at all. She was sent to Liverpool, but she died within six weeks from secondary growths in the pelvis, the liver and other parts. There is a very good painting of her in the Johnson Laboratory at Liverpool. If any members of the Association should visit Liverpool, I advise them to see it, as it is an interesting case. A good deal has been written upon cancer by Dr. Bashford and other writers, and I should like to ask Dr. Murray whether he can confirm the statement that there are cancer-infected houses. In my experience I cannot say that there are cancer infected houses or stables. These cases that I have mentioned came from different parts, and there was no connection with any preceding case as far as I know. They were certainly old animals. From what I have read, I gather that cancer may be due either to a parasitic cause or to some latent embryonic cells or to irritation. Each animal I have mentioned had had four or five foals, I think one mare had seven, but I was not aware that there was any constant irritation in the vulva. I should be very pleased if the author could give the members generally any indication as to whether it is parasitic, or what irritation there is, or whether the statement that cancer-infected houses exist is really substantiated.

Mr. G. H. Livesey: I take it that Dr. Murray in writing this paper is not only giving us information, but seeking for further information from us. I think at the same time while he is down here we should do our best to get what little we can out of him. I do not think he tells us very much in the paper, at least he does not tell us, as Mr. Hobday has said, exactly what we want to know, nor I think does he lay down for us the lines which he and Dr. Bashford would like our work to follow, so as to be of the greatest help to the various research laboratories throughout the kingdom. It would be interesting to know if in his researches Dr. Murray has been able to find out whether diet has any influence on these new growths, particularly whether they are more liable to be found in herbivora, or carnivora, or omnivora. It seems to me, from the little I have seen, that they are certainly of greater frequence among the flesh eaters, that is to say, the number of cases of tumour formations that one sees is greatly in excess in the dog compared with that, say, of the cow and the horse. Possibly the effect of continued feeding on flesh may have something to do with the existence of tumours. Another thing Dr. Murray may perhaps be able to give us some information on is: Can he account for the variation in malignancy in certain growths? My practice lies entirely among dogs, and among them carcinoma of the mamma is extremely common, far more common I think than we realise—because a large number of dogs go through our hands and our attention is not drawn to the smaller growths. Possibly we are not consulted about them until they have grown so large as to be obvious to anybody. But if one examines a large number of bitches, and pass your hand down the belly, in a bitch eight or nine years old you will almost invariably find some slight induration or hard shot-like body situated somewhere in the mammæ. Sometimes you will find one, and sometimes hundreds. If such a case comes under your hands after death and you make a post-mortem examination, you will find almost invariably that these little indurations are new growths. It is curious that in some of these growths there is practically no malignancy. I myself have removed them many and many a time, and have had no recurrence ; but in others I must say operative interference has only aggravated matters, and instead of a growth remaining localised it has spread rapidly ; there have been metastatic formations, and death has invariably resulted. Perhaps Dr. Murray, from the examination of the tissue cells and watching their mode of growth, which he has been particularly able to do in examining Jensen's formation which he has growing in the mouse, may have found out some peculiarity in the cell growth which may explain the malignancy. Certainly if we could find out during life what the malignancy of the growth was likely to be we should be guided in our practice as to the advisability of removal, and it would be of inestimable value to us, particularly when dealing with old favourites, because it is a bad thing for a man to have to advise an operation and by operating to curtail the life of his patient.

A point has been raised as to animals suffering from cancer which is visible to the naked eye, and the non-recording of cancer, say, of the liver or of the uterus. I think a good deal of that depends—certainly in the case of the dog, upon the fact that the dog is rather a plucky animal, and he seldom shows the seriousness of his ailment until that ailment has reached a very critical period. I have often noticed a dog suffering, say, from some disease of the liver and one does not quite know what it is ; one expects a new growth or a cystic condition because one can feel it. The dog becomes dropsical and eventually dies, perhaps in six weeks. On making a post-mortem on such a case, one sees the liver in a state that must have taken far longer than six weeks, or two months, or six months to have reached the condition in which we find it, and yet perhaps within six weeks of its death the dog showed no clinical symptom. I have seen sarcoma which must, from its appearance, have been of fairly long standing give no symptom until within ten days of death. I have also seen tuberculosis in the liver and in the spleen of a dog, the liver and spleen being tremendously enlarged and practically infiltrated with tubercle, and the dog showed no clinical sign of being infected except the careworn look that comes into the face, the wasting of the temporal muscles, and the greyness of the hair on the face, until within a fortnight of the dog's death, when rapid emaciation set in. There was abdominal pain, and as the emaciation increased one could feel the immense growth in the abdomen. The dog wasted rapidly and got weaker, and when it was practically dying I gave chloroform and destroyed it. On making a post-mortem I was astonished to find the amount of infection, and the extent to which the disease had attained during apparently a very short time. The owner was a doctor, and he had watched the dog. It had been a great favourite of his wife's, and he declared to me he was certain the dog had enjoyed perfect health for twelve years, and it was only twelve years and three months old. If a dog suffering from such a serious disease as that shows no clinical symptoms to within three or four weeks of his death, how can we be expected to diagnose the presence of abdominal cancer, or, anyinternal cancer during life ? A dog will not come and say it has a pain here, or give us some indication of where the pain is felt ; it does not show it until it is so ill that it has to give up, and I think that accounts to a great extent for our lack of information on internal tumours.

The interruption of lactation has been mentioned to-day as a cause of cancer through local irritation and setting up a change in tissue formation. Mr. Hobday has made a very great point I think in drawing attention to the case of the cat, because certainly in that case lactation is continually interrupted, and we do not often find cancer of the mamma in a cat ; at least you cannot compare the number of cases that come under our notice with the number of cases that occur in the dog. If cancer arose from the interruption of lactation in the dog, how is it that we so frequently see it in the case of virgin bitches ? Certainly in virgin bitches one occasionally gets a peculiar form of lactation following nine weeks after the period of heat. That has been explained to me as a kind of protest on the part of nature, and disappointment on the bitch's part at the loss of conception. How far that is true I do not know. Certainly lactation does frequently occur nine weeks after oestrum, and it is very common to find a cancer or sarcoma in the mamma in such bitches when they attain the age of 8 or 9 years.

Generally the condition that I have found has been a cancer, that is to say, there is a large amount of cartilaginous tissue, and very often a certain amount of calcareous deposit. If local irritation were a cause of cancer one would expect to find the irritation that is continually present, say, on a dog's back, to be a cause. Certainly there is more irritation on the back than there is on the belly, and yet it is on the belly and scrotum, and places like that that we more frequently find cancer. Take the case of the ordinary Scotch terrier, perhaps the dog that suffers most of all from chronic skin irritation all down the line of the back, one would expect to find occasionally, anyhow, a certain number of new growths on the line of the back. But that is not really common. Perhaps the most common forms of new growths that you find on the back are the cerebrated warts, which are not malignant and are very easily removed. So that I do not know that one could regard local irritation in the dog as a cause of cancer. Prof. Wooldridge has mentioned infective granulomata, and certainly they are one of the most interesting class of tumours we have to deal with. I must say that those that have come under my notice have not been easily cured. Cases of recovery certainly occur, but those cases, in my experience, are limited entirely to those in which operation is performed early. When once the granuloma has burrowed its way through the mucous membrane and become adherent or grafted into the tissues beneath it, then it extends rapidly, and though one may remove the growth of the surrounding mucous membrane, a recurrence nearly always occurs. Quite recently I had two bull bitches brought to me with growths which I was told had grown within the last three weeks. The appearance gave one to believe that they had been in existence for considerably longer than that because they had not been operated on before. If an operation fails, undoubtedly the growth grows quicker than before. In these cases neither had been operated on. When I came to remove the one I found that the growth in the vagina was quite a minor matter, but that underrunning the mucous membrane and working deeply into the surrounding tissues was a growth of a far greater extent. I do not see how such a growth as that can be called easily curable, and I should say once more that the only cases which have ever been successful in my hands have been those which have been removed at the earliest possible moment, and practically when the growth has not attained a size greater than that of a pimple. As to their being not really harmful, that I think is a mistake, because I have seen death occur on more than one occasion. I think Mr. Hobday has seen similar cases, where the granuloma has increased greatly in size; there has been a large discharge from the vagina; the dog has wasted and become emaciated, and gradually declined into a kind of marasmus from which it is impossible to arouse it, and death supervenes. Then with regard to papilloma, they are quite innocuous. I do not believe that papilloma are infectious. They are undoubtedly contagious, and can be grafted from one dog on to another, but can scarcely be called infective. If I were asked if I would give a certificate or a clean bill of health to a dog that had papillomata throughout its mouth, I should certainly give it a clean bill of health. It is not infective, and if it is kept twelve months the whole of the growths will spontaneously disappear.

Mr. P. J. Howard: There are a few things I would like to direct Dr. Murray's attention to. I am sure it is quite unnecessary for me to direct the attention of the ordinary men present to them, but it may be useful for Dr. Murray to know that he has the right to enquire into the truth of any information that he gets before he publishes it broadcast to the profession. Prof. Wooldridge has already called attention to the fact that, during his time in Ireland, he was not aware that cows were used for draught purposes. I can speak with more authority than Prof. Wooldridge on the subject, as I happen to have lived all my life in Ireland, and I can assure Dr. Murray that his information on this subject must have come from a very unreliable source. I understand that the information came from a Mr. Trotter. I think Mr. Trotter has a particular anxiety to misrepresent things Irish in general. (Laughter). It is not very long since this same Mr. Trotter libelled the Irish people. (Laughter.) I simply wish to correct Dr. Murray on that point. Then I would like to know whether Dr. Murray has any information to give us as regards the extent to which cancer is met with in fowls. For the last two years I have sent some specimens of fowls affected with tumours to the Royal Veterinary College in Dublin, and Prof. Mettam told me that they were typical cases of cancer. I would like to know from Dr. Murray whether he has had any experience with such cases. As regards cancer in cattle I have also had several cases of cancerous growths in the eye and the orbit, generally in cows. With regard to the irritation theory, it is rather curious, considering the great irritation that the udder of the cow is subjected to, both in the way of being allowed to run dry, and so on, that there are not ever so many more cases of cancer of the udder recorded in cattle. I myself have never seen one. Dr. Murray also refers to the melanotic tumours in grey horses. I do not thoroughly understand what he says in the paper about that, and I should like to know whether it is his experience that these melanotic tumours have been found taking on a cancerous appearance, or whether he simply means that he has found cancerous growths of a melanotic character. I should also like to thank Dr. Murray as a medical man for coming before this Veterinary Association and giving us this paper. (Cheers).

Reply by Dr. J. A. Murray.

Dr. J. A. Murray: Permit me first of all to thank you for the courtesy which allowed me to represent Dr. Bashford here to-day. He regrets very much that important private business and the pressure of his official work prevented him addressing you on this subject, and your kindness in allowing me to meet you is, I assure you, very much appreciated both by Dr. Bashford and by myself. In spite of the slight disappointment with the paper that some of the members of the Association have expressed, I think the discussion has been an extremely interesting one, and if you will allow me I will take the remarks that have been made one by one. In the first place, Prof. Hobday wished to know where the scepticism and discrediting of veterinary observations had occurred. I was principally thinking of several observations which were made about three or four years ago before the German Cancer Committee, where the statement was made, for example, that carcinoma of the vagina of the dog and the horse was an extremely benign disease, and practically was not cancer at all; that it never produced metastasis, and that it did not infiltrate, and so forth. Those are all gross errors which everyone of you is able to correct from his own experience. The question of the frequency of cases and the frequency of the disease in different organs of different animals is one which is, like all statistical problems, hedged around with an extreme number of actuarial difficulties, and one must be careful in taking cases, for example, which come to one's notice as under treatment, as representing necessarily the frequency of the disease, or unless they are extremely extensive, as giving a sure ground of comparison between different species of animal. For example, I need only point out to you that the cow and the dog are both kept in very large numbers in this country; but while the cow, that is the female of the ox, is kept in large numbers, the female of the dog is not. I think there is no doubt that a far larger proportion of the dog population of this country, if I may use the expression, is male than would be naturally represented if dogs were allowed to breed irrespective of the desires of their owners, and the survival of the offspring determined by the health of the animals. Therefore you can naturally see that the number of cases of disease in one organ or the other may be profoundly affected by these considerations. The question of the frequency of cancer in the cat is one which interests me a great deal, because the histological material which one obtains from the cat is very beautiful. I think that of all domesticated mammals, the histological preparations from the cat are the finest we get. Of all the mammal material that we get, they compare the best with the material that one gets from the amphibia, and therefore the frequency or the reverse of cancer in that animal has a particular interest for me. With regard to the frequency of cancer in the mamma of cats, it is a curious thing that the frequency of cancer in the mamma of the dog and cat in my material has been very much the same, about a quarter of the cases. I purposely did not give detailed lists of the cases which I have had; they will all be published in the course of the next month or so in a forthcoming report, and the previous cases which we have had, have been published in the first Scientific Report of the Cancer Research Fund, so that they are quite available to anyone who is interested in the matter. But, curiously enough, no one made any reference, which I rather anticipated, to the point I raised as to the ease with which cats or dogs are examined clinically. I have myself attempted the examination of a considerable number of both animals, and on the whole I must say it is easier to make a thorough examination of a dog than of a cat, because all you have to guard against in the case of a dog, even if he is not willing, which he usually is, is the danger from his teeth. But the cat has a set of teeth at the end of each leg, so to speak, and you have to guard against them as well. I do not know why cancer of the uterus is so rare in animals. A certain number of cases were recorded by Sticker I believe, but from what I know of Sticker's observations in some other directions, I must say I regard some of his statements with a considerable degree of scepticism. In the uterus of the dog I have frequently found peculiar polypous outgrowths of the mucous membrane, but I have never seen a case of carcinoma or sarcoma. The only case of carcinoma of the uterus which has been brought to my notice is that one which Mr. Trotter sent me some years ago from the cow. Everyone must acknowledge the excellence and the care with which Mr. Trotter has recorded the incidence of malignant disease in animals. He has really a remarkable amount of material brought together in Glasgow, in the Moore Street abattoir, and I acknowledge, for one, that I had no idea either of the wealth or the beauty of the material which can be obtained from those animals until he brought it to our notice.

Prof. Hobday has attempted to bring in the question of irritation rather more widely than I had dared to do, and refers, for example, to those cases of carcinoma of the throat and the œsophagus as also probably determined in the same way. I was particularly anxious that only those cases of irritation should be referred to which are definite, localised and peculiar, because it is only in such cases that we are justified, with a disease like cancer which is most frequent in old animals, in speaking of a direct causal connection, which however in every case is not an immediate one. It is not that the irritation acting directly upon the tissue will always produce cancer in that tissue. Nothing of that kind has been seen, and I only wish we could lay our hands upon something of the sort. What you find is, that out of a certain number of animals affected by on especial kind of chronic irritation, a certain proportion, generally a small proportion, develop malignant disease on that very site of application; but that is a very different thing from saying that the cases of cancer of the throat, for example, are due to the irritation of bones and so forth passing down the throat. I do not know that the two are on the same footing at all, such as the cases of paraffin cancer, or brand-cancer or the "horn-core" that is met with in India. It is certainly a remarkable thing that, while I do not know that I have ever had a case of carcinoma (epithelioma) from the root of the horn in this country, (which is another confirmation, by the way, of Mr. Howard's remark that cows are not used as draught animals in Ireland,) from India I believe quite a number of cases have been obtained, of the horn to which the traces are attached in draught animals developing carcinoma at its base.

As to the effect on the mamma of the interruption of lactation, that was put out in the paper as a very tentative suggestion, and I do not think that much weight should be laid upon it. In the mouse, for example, you very frequently get carcinoma of the mamma, and the mouse generally suckles its young as long as it likes, in fact you will see two or three litters suckling at the same time. You also get carcinomata of the mamma in male dogs, in fact the only case which I have been able so far to transplant successfully, was from a male dog.

As to the carcinomata of fish, apart from the tumours of the thyroid gland, which have a commercial importance and may come to the notice of some of you, the tumours are extremely difficult to get. Out of several hundreds of new growths obtained from fishes which have been sent in to us in the last two or three years, I have only seen about five or six cases. It represents an enormous amount of material to go through, and it has been gone through in the most careful manner by all sorts of differential methods in order to exclude the presence of infective granuloma, which has quite a different appearance in fishes from the corresponding diseases in higher animals.

Then Mr. Hobday would like to know more as to any definite parasitic cause of cancer. I am afraid I cannot enlighten him on that subject. Up to the present we have no evidence whatever that there is a virus essentially associated with cancer. There are any number of micro-organisms found in malignant new growths, especially in those that are ulcerated. There are spirochætes found in tumours which are apparently not ulcerated, but you can also find growths quite as malignant, extending in various directions, in which all these organisms are absent, and the biological characters, the manner of growth and the way in which the cells of these growths behave when we transfer them to new animals are quite incompatible with the view that they are infective growths, and that their powers of extension are due to the presence of a virus, and that is the important thing we wish to know.

So far as the cure of cancer is concerned, I have nothing to say. The experimental work, to which everyone at present looks for advance in this matter, has not yet gone far enough to enable us to say whether the control of the disease is within sight. At present thorough surgical operation at the earliest possible opportunity is the wisest and the most hopeful course.

Prof. Wooldridge was the first to bring up the question of draught cattle in Ireland, and I am very glad indeed for the correction he made. I cannot at this moment remember the source of my information. It may have been Mr. Trotter, it may have been someone else ; but I am very glad to know it is incorrect. For the life of me, however, I cannot understand why anyone should consider that was a disparagement or anything else against Ireland. I think it is the contrary. I know that in many parts of Germany and France, where there is an extremely wealthy, strong and good peasantry, cattle are used in preference to horses as draught animals. With reference to the site of the disease in those animals, the lists which will be published in the forthcoming Report and which have been published in the previous Report will give most of the information which Prof. Wooldridge required.

With regard to the other records, what I said about Sticker is quite serious enough, especially the way in which he has dealt with the mammary tumours and the infective venereal tumours of dogs. He records the latter as lymphosarcomata, which are transmitted by means of the transference of cells from one animal to another, so that those cells which we find growing in our patients to-day are not cells of that particular dog which belongs to the owner, your patient, but are cells from a dog somewhere back in the Tertiary Age, which have been transmitted through countless generations and are still growing. That is possible, but it has not yet been proved. There is another curious feature of these venereal tumours in dogs, that while, when they are transplanted deliberately under the skin, they frequently disappear spontaneously, the spontaneous disappearance of the naturally occurring disease is very rare, in fact I have never heard of it taking place. The animals in which this spontaneous disappearance of inoculated tumours has taken place are resistant to a further inoculation, but you will find they can be inoculated by rubbing in on a scarified surface the secretion from another spontaneous case. I have seen once a case of spontaneous disappearance in an animal naturally affected, but that was apparently a case of auto-infection, and the secondary infected tumour had disappeared, whereas the primary growth, the growth in the vagina went on, and ultimately killed the animal. While on the subject of venereal tumours I may just remark that recently Sticker and Sanfelice have both been making experiments on the cure of this tumour, under the belief that it was a true lymphosarcoma, and that therefore they were advancing to the cure of cancer as it occurs in man. I cannot at present recollect what Sanfelice's treatment consisted of, but Sticker has used atoxyl, an organic arsenic compound, and also a serum of strange species, principally the sheep. As Sticker has only produced the absorption of transplanted tumours, which frequently disappear of themselves, and has not published any records of similar action upon the naturally occurring cases, I think that the operative treatment must still be regarded as holding the field.

As to the malignancy of sarcoma in dogs, a point which Professor Wooldridge raised, I doubt very much if any one can definitely use the histological character as a sure guide to the malignancy of the tumour. There are no doubt general truths which one can regard as settled, but in any individual case one must always regard any tumour as the most malignant, and treat it accordingly. I think that is the only line in which safety lies.

The sarcomata of which I have specimens include a rather remarkable number of peculiar growths from those granular cells of the subcutaneous tissue in which the granules stain metachromatically—when you use a blue stain they stain red. I have a number of these from the dog, both from the fore and hind legs, and in several of these cases large metastases have formed in the lymphatic glands and other organs. Curiously enough I have never as yet obtained a specimen of those infective papillomata of the dog. I have often heard about them, but I have never had a case sent to me. I should like very much an opportunity of studying it at some time, because the disease is apparently something like that which occurs in pigeons, and is produced by a virus which can be filtered through Chamberland filters, and produces an enormous hypertrophy of the epithelial layer of the skin.

I do not think Mr. Dixson, of Margate, desires me to refer to any of the rather interesting observations on individual cases which he brought to our notice. It is hardly possible for me to give you any information of a purely clinical character which will help you in the very least, as far as I can see: that, of course, is not my line of work.

Mr. Hughes asked me about the occurrence of cancer houses. Cancer houses are principally recorded with reference to the human subject, and they have been investigated by a considerable number of people ; and the greater frequency occurs according to the ease with which a man is convinced that his records are reliable. He gets hearsay information, from some old lady in a country village, that her aunt or her cousin died of cancer thirty years ago in a house. There is no gainsaying that it may have been true, but that does not prove it, and there is nothing definite as to the nature of the cases and as to the time during which they have occurred. Until the information is absolutely clean and sharp, cancer houses, I am afraid, must remain rather a brilliant speculation than anything else. There is, however, information of a similar kind with regard to the cages in which small laboratory animals have been kept. A considerable number of cases have been published where out of one cage so many cases of cancer have been taken in the course of so many years. We have kept now for the last six years thousands of mice of adult age in cages in our laboratory, and have paid particular attention to anything in the nature of the occurrence of spontaneous cases grouped together in those cages, and up to the present I have not any information whatever. I have never seen anything of the kind which has been described by Borrel and other people. I do not say their observations are wrong ; I only say I have not seen it, probably with very much larger material than they have had at their command. In the same way I have now 200 cases of carcinoma of the mouse sent in by breeders ; and when I take the dates upon which these cases come in, and arrange them in columns, I find that the cases occur alternately, and that the breeders who send us in most mice send us most tumours. But you do not find that all the cases come from one man and none from another. The main thing is, how long has that man been breeding mice, and how many old mice has he got on his place ? If he has six times as many as another man, he will probably send you three or four cases for every one that the other man sends.

Mr. Howard asks me about cases of cancer in fowls. I have had a great number of tumours from fowls sent to me, but most of them have been tubercle. There are two or three cases of squamous-celled carcinoma around the mouth or the palate ; there are two cases of columnar-celled carcinoma from the intestines ; and I received several specimens of sarcoma in fowls from Mr. Gilruth, of New Zealand, but up to the present those are about the total number of cases from birds. I hope, however, that with the collaboration of this Association the number of those cases will be greatly added to in the near future. I think the melanotic tumours in grey horses are in many cases malignant. They are tumours of rather slow growth, and if you see them at the begining of their course they are still quite circumscribed and small, but in quite a large proportion of the cases, I think, when these tumours are removed they are found to recur and produce metastasis in internal organs. I have had several cases under my own observation, not only of metastasis of the lymphatic glands but in the lungs and heart.

Mr. Livesey asked me about the influence of diet. There, again, all one can say is that there is no diet an animal or man can take which will surely prevent him taking cancer. You find that men who live entirely on vegetarian diet, such as some of the castes of India, also suffer from cancer, and animals which live entirely on a flesh diet are also prone to it. Beyond that, without long experience for many years and an actual knowledge of the number of the animals in which the cases occur, it is impossible to say whether one form of diet gives a greater or a less frequency. As to what he calls variations in malignancy, that, I take it, is of the tumours of one organ, and apparently similar in clinical appearance. That is also the very unfortunate experience of everyone who has to do with cancer either in man or animals. I can give you one or two observations which I have made in mice which I think are of interest in that connection. If you keep a mouse tumour under observation for a long time you find that it does not grow at a uniform rate, that is to say, you cannot say that, taking it week by week, the increment is the same. You find that the tumour remains stationary for a long period, then grows rapidly, and then remains stationary again. It may also partly diminish in size for a period, and then begin to grow again ; so that even within the life history of any one single tumour, you have variations. The growth of the cells is not a mechanically uniform process. If you attempt to transfer such a tumour to normal animals by cutting it out and keeping the host animal alive, you will frequently find that, say, at your first operation your results are all negative. The tumour grows ; after six weeks or three months you cut it out again and transplant, and find it grows. You say, "Here is a case where operation has increased the malignancy of the tumour," But just wait. In another three or four, or six weeks your tumour recurs again. You transplant it again, and your experience is very frequently that again the tumour is quite negative, it does not grow, *i.e.*, there is a natural fluctuation in the energy of the growth of the cells which takes place irrespective of what you do to it. Probably the same thing occurs in other spontaneous cases.

With reference to the ease of total extirpation and the danger of dissemination by operative interference, I had such an example in a mouse quite recently, where a mouse had two small tumours, one in the axilla and the other in the groin. If anything the one in the axilla was the smaller tumour, but the only difference between them otherwise, was that the tumour in the groin was diminishing in size, while the tumour in the axilla was increasing in size. I etherised the mouse, and excised both the tumours. After an interval of about three months, I suppose, the tumour in the axilla, which was increasing in size at the time of the operation, had recurred and grown to an enormous size, nearly six grammes, while the tumour in the groin was completely eradicated and had not recurred. So I think the indication there is that, when we find a growth which from its situation or character appears to be a malignant growth, and we find it diminishing in size, that is not an indication not to operate on it, on the contrary I would make as complete an operation as possible, in the belief that in those circumstances the risk of recurrence is greatly diminished. I think that refers to the question as to the increase of malignancy by operation.

The question of the diagnosis of internal cancer is a very difficult one, and in the hospital cliniques of London the number of cases which cannot be diagnosed certainly during life is really very remarkable. Rather more than a third of the cases of internal cancer are not diagnosed during life in the human subject, and that is where, as Mr. Livesey pointed out, you have the life history in full of your patients, and still there is that enormous margin of error. The margin of error which you get in an animal like the cat or the dog can therefore easily be imagined. The best statistics are undoubtedly those of post-mortem examinations, animals destroyed or killed for any purpose. There we have definite data to go on. You have the date of the death of the animal, and you can generally say how old the animal was at the time, within a certain margin. Then you can get together the proportion of the cases in the different organs of the body at different ages by means of such observations carried out for a long time and carefully recorded.

With reference to the effect of chronic irritation, which I do not think is so very important, the influence can be recognised in many cases when the form of irritation is peculiar, but that is all we can say. To try and find out a form of chronic irritation for every case of cancer is a mistake; it is only when the chronic irritation produces that cellular state on which cancer may arise later. There is the case of Waterloo Jack, the dog that collected subscriptions at Waterloo. He had a large sarcoma on the back, if I remember rightly. I cannot now remember whether the site on which the tumour occurred was associated with any irritation, such as a strap carrying the box, or not, but perhaps some of you who remember Waterloo Jack may know.

I received a note this morning from Mr. Inglis McCallum, asking me three questions: first, What is cancer; secondly, What is the cause of cancer; and thirdly, Is there any cure for cancer? (Laughter) What is cancer? I might, being a Scotchman myself, take up the line that cancer is a malignant new growth, and has been used throughout by me in that sense, not as carcinoma and sarcoma, and escape from the difficulty in that way; but I prefer to say, I do not know. And the same remark applies to What is the cause of cancer. Is there any cure for cancer? I think I have already dealt with that.

Gentlemen, I thank you very much for the kind way in which you have discussed the paper, and the patient way in which you have listened to my rather rambling reply.

Mr. E. W. Baker: Might I ask Dr. Murray, what his opinion is upon the question of heredity in cancer. It seems to me that that bears a very marked influence on the disease.

Dr. Murray: The question of heredity has been raised very frequently, and the liability in a hundred families of a certain number to have cancer and so forth has been worked out statistically; supposing that the distribution of the disease were that of the general population, and not determined in any definite way, such as by infection and so on. Calculations of that kind show quite clearly that cancer is so frequent that there are few families in which it has not occurred, or in which it is not likely to occur within two generations. Therefore to approach this problem with any prospect of a final solution, we have started the breeding of mice directly from animals suffering themselves from spontaneous cancer. Those experiments are at present going on, and I hope in the course of a year or two will be far enough advanced to enable a provisional answer to be given to the question. At present I can say no more.

Mr. J. J. Bell: I rise to propose a hearty vote of thanks to Dr. Murray for his paper, and for his lucid explanation of all the queries which have been put to him. I have never been to any meeting where I have so much enjoyed the answers which have been given to the questions asked. There is one further one I should like to ask Dr. Murray, and that is whether he considers the flesh of an animal suffering from cancer is fit for the food of man, because it was stated in this room by an eminent professor that an animal suffering from cancer had been sent to the abattoir. I should like to have that point cleared up, that we as veterinarians may not send to slaughter any animal that is likely to convey disease to the human being.

Dr. Murray: That is a question which can be also answered in a few words. The question is not one of a direct danger of cancer from the ingestion of cancerous material, because we find that, even under the most favourable circumstances, it is impossible to transmit a malignant growth from one species of animal to another. For instance, malignant growths of the mouse do not grow in the rat, and the malignant growths of the rat do not grow in the mouse. In the case of meat for human consumption, naturally any portion which actually contains the growth will not be passed by any inspector, but if the animal is in good condition I do not see there is any valid reason whatever why the healthy portions of the body, especially the muscles and the limbs, should not be passed in accordance with their natural appearance.

Mr. E. W. Baker: I should like to second the vote of thanks which has been moved, and at the same time to express my personal thanks to Dr. Murray for the excellent and effective manner in which he has answered the questions which have been raised.

The President: I am sure I associate myself with all that has been said both by the proposer and seconder of the vote of thanks to Dr. Murray. Dr. Murray has written this paper for us, and we know how completely and lucidly he has defended that which he has written, and in that way I believe our knowledge of cancer has been increased. We are very much indebted to Dr. Murray for the pains he has taken. It is a distinct advantage to have the subject brought before us, because we as veterinary surgeons have to deal with the disease, and to us it is an important matter—a matter on which we have for so many years been comparatively in the dark, but of which we hope soon, by the labours of the Cancer Research Fund, to know more. There is nothing like the bringing together of a great quantity of data from which to gather the special knowledge that we are all thirsting for, and we are therefor indebted to Dr. Murray, who is collecting material from which to obtain information for the blessing of the human family.

The resolution was then put and carried by acclamation.

Dr. Murray, in reply, said: Mr. President and gentlemen, I thank you very much for the exceedingly kind way in which you have received the proposal. I have the pleasure of having quite a number of friends in the veterinary profession, and I feel I have increased the number to-day, both to my own advantage and the advantage of the organisation with which I am associated.

Mr. J. F. SIMPSON: Gentlemen, you will see at the end of the list of Members of the Association we have a list of Honorary Members, composed of gentlemen who have been of great assistance to the veterinary profession. We have had to-day an admirable paper, which has drawn forth a spirited discussion, and which in its turn produced an excellent reply from which we shall gain much instruction. I therefore ask your permission, Sir, to make a somewhat unusual departure. There is no rule of our Association which says we must give notice of a proposition to ask an eminent gentleman to accept an honour at our hands; and therefore, with your permission, I propose that we give Dr. Murray something more than the formal vote of thanks, hearty as that vote of thanks was, and that we ask him to accept at our hands the distinction of Honorary Membership. I propose that Dr. Murray be elected an Honorary Member of the National Veterinary Association. (Cheers).

Mr. J. J. BELL: I have great pleasure in seconding that.

The PRESIDENT: I feel sure that none of you will feel that this is an empty distinction; it is one that is replete with meaning to everyone present. We delight to honour Dr. Murray for his great kindness in helping us, and it is with very great pleasure that I put to the meeting that we now elect him an Honorary Member of the National Veterinary Association. (Cheers).

The resolution was put and carried with acclamation.

Dr. MURRAY, in reply, said: Gentlemen, I thank you all very much. I feel in a way that the privilege of belonging to your

Association is a very appropriate one, because although I belong officially to the profession of medicine, my lines have been cast for the last four or five years more in the direction of veterinary medicine, and my patients have been cats and dogs, horses and mice, and not men. I assure you that I have obtained great profit from that extension of my line of work, and I thank you very much for the honour you have done me in electing me an Honorary Member.

Adjourned for lunch.

TUBERCULOSIS IN ITS RELATION TO MEAT AND MILK.

By John S. Lloyd, F.R.C.V.S.

Tuberculosis is generally defined as a contagious disease, caused and disseminated by the ubiquitous tubercle bacillus discovered by Koch in 1882. Two forms of the disease are generally recognised—the avian and the mammalian.

For the purpose of this paper the avian has only a passing interest, for, although it is common in the domestic fowl, and is seen to a much lesser extent in turkeys, and occasionally in pheasants bred and reared in captivity, the wasted condition of the birds is generally so marked that it is useless to put them on the market as human food. From a pathological point of view the avian form of tubercle is interesting, in that it is more easy to infect fowls with the disease by ingestion than by any method of inoculation other than intravenous injection (1) whereas feeding fowls with large quantities of human and bovine tubercle bacilli generally fails to cause infection. A further point of interest in connection with the avian tubercle is the fact that in 1895, Johne and Frothingham surmised that the form of chronic enteritis in cattle now known in this country as Johne's disease was due to infection with the bacillus of avian tuberculosis, but according to M'Fadyean (2) the acid-fast bacillus of Johne's disease is distinguished from that of avian tuberculosis, inasmuch that it is not inoculable to either guinea-pigs or rabbits, and so far has resisted all attempts to induce it to grow outside the body on artificial media.

In connection with the mammalian form of tuberculosis, two types of tubercle bacilli have been recognised by many authorities—the human and the bovine—but as the result of the extensive bacteriological investigations, carried out all over the world since Koch's startling statement at the British Congress on Tuberculosis in 1901, investigators are now generally agreed that the two types are, if not identical, at least closely connected by transition forms. Koch (3) and certain American authors have directed attention to the differences, as revealed in their cultural appearances and pathogenic power for different species of animals, between the tubercle bacilli obtained from men and oxen. Some declare the differences sufficiently marked to permit of dividing the bacilli into human and bovine, whilst others are of the opposite opinion. The Royal Commission in their second interim report, after investigating sixty cases of human tuberculosis, divided them into three groups, two which were very clearly distinguished from each other by the properties and characters of the bacillus found in each, and one containing a few cases which presented exceptional features differing in one respect or another from all the other cases. After studying the effects produced on animal bodies by the introduction of the bacillus of tuberculosis, the Commissioners found it clear that the effects produced by the introduction of the bacillus from the cases of human tuberculosis forming group 1 are in every respect one and the same as the effects produced by the introduction of the bacillus of bovine tuberculosis.

The bacillus of group 2 of cases of human tuberculosis is far less virulent than the bacillus of bovine tuberculosis, very large doses, even, do not set up generalised progressive tuberculosis in the bodies of bovines and rabbits, the powers of resistance of those animals either arresting the progress of any tuberculosis which may have begun, causing the disease to retrogress or preventing the disease being set up at all. But in all essential features the Commissioners found that the disease set up by the bacillus of bovine tuberculosis is identical with that set up by the bacillus of group 2, such differences as are met with are differences of amount and phase only, the bacillus of bovine tuberculosis having sufficient virulence to easily produce its effect on the more resistant bovine and rabbit as well as other less resistant animals, while the bacillus of group 2 of human tuberculosis, being essentially less virulent, is not able to produce its full effect on the more resistant bovine and rabbit, though it can produce them on the less resistant guinea-pig, monkey, and man.

The difference in nutritive and reproductive power is the essential difference between one bacillus and another, and this enabled the Commissioners to arrange all the bacilli which they studied into two classes—one, the dysgonic, in which the bacillus grows with difficulty on artificial media, and another the eugonic, in which the bacillus grows readily on the same media. In the first class they place the bacillus of bovine tuberculosis and the bacillus of group 1 of human tuberculosis as these exhibit the same range of growth on media, and the same correlated variations in microscopical features; are in all respects one and the same. In the second class they place the bacillus of group 2 of human tuberculosis, but add that the demarcation between the two classes is not a sharp or broad one, the difference being one of degree only, the least dysgonic of the one class differing slightly, if at all, from the least eugonic of the other.

The cases which the Commissioners put in group 3 differed widely from each other and were grouped together for consideration purposes only, and were chiefly of interest because in them the Commissioners met with "(*a*) bacilli of a character intermediate between group 1 and group 2. (*b*) replacement of a eugonic bacillus of low virulence by a dysgonic bacillus of high virulence in "passage" experiments, and (*c*) indications of instability in virulence and cultural characters, and of want of accordance between virulence and cultural characters."

BACTERIOLOGY.

Tubercle bacilli are rod-shaped parasites, 2·5 to 3·5 *u* in length, and 3 *u* in thickness, although longer forms are sometimes met with. They are non-motile, and in the tissues occur scattered irregularly or in little masses. In culture they often form masses in which the bacilli are arranged close together in a parallel maner. The tubercle bacillus only stains slowly and faintly with ordinary staining re-agents, with strong solutions of gentian violet, or fuchsin and carbolic acid applied for a long time or with heat, satisfactory staining results can be obtained. In consequence of their fatty covering, when once stained the bacilli resist decolouration with dilute acids and alcohol, and are consequently termed acid-fast or acid-resisting. Taken in connection with its other biological properties this tinctorial behaviour of the tubercle bacillus is of some value for diagnostic purposes but the fact that several other kinds of bacilli are also acid-fast must not be overlooked. In addition to the bacillus of tubercle the following are acid-fast:—the bacilli of avian tubercle, of leprosy and of Johne's disease, the smegma bacillus, the Timothy bacillus, the mistal bacillus, the Petro-Rabinowitsch butter bacillus, and several others occasionally met with in butter and milk. Subcutaneous inoculation as ordinarily performed in guinea-pigs will show Koch's bacillus to be truly pathogenic, as it multiplies at the point of inoculation, and spreads by means of the lymphatic system to other centres and organs.

INFECTION.

A healthy organism may become infected with tubercle in several different ways, inhalation, ingestion, copulation and inoculation, and in the fœtus by the blood-stream. In the latter case the infection is carried from the diseased womb of the mother by the umbilical circulation to the fœtus causing congenital tuberculosis, but as this condition is of comparative rare occurrence it may be dismissed without further consideration. Infection by means of copulation can only take place when the genitals are the seat of tuberculosis. In the male, tubercular orchitis may infect the uterus of the female, and so be the indirect means of infecting the fœtus. The disease in the female genital organs is however of more importance owing to the infectivity of the uterine discharges in such cases, as mentioned by Walley and Bang among others. The inoculation method of infection is not commonly met with in general practice, but is of great interest owing to its extensive use in carrying out investigations, and for purposes of diagnosis. The methods most commonly employed are the subcutaneous, intra-peritoneal and intra-venous. There is no doubt that the remaining methods of infection, namely inhalation and ingestion, are far the most important pathologically, and require some further consideration.

Considerable controversy has taken place over infection by inhalation. M'Fadyean (4) states that "the parts of the body which are the most common seats of lesions in tubercle of the ox are the bronchial and mediastinal lymphatic glands and the lungs; in a large number of cases the disease is confined to those parts. . . . It seems impossible to find any other reasonable explanation of these facts than that the common method of infection in the ox species is the inhalation of tubercle bacilli suspended in the atmosphere."

Nocard (5) gives the lungs and pleura as being affected in 40 per cent. of tuberculous cases, and the lungs alone in 20 to 25 per cent., thus supporting M'Fadyean as to the seat of the disease. Numerous experiments have been undertaken to prove air-borne infection in tuberculosis, and the fact that the dust of houses, workshops, etc., occupied by consumptive persons is infective has been proved by Arnet and Coates (6). Both these experimented with dust from houses, etc., occupied by consumptives and got positive results, Cornet, 67 per cent., Coates. 61 per cent. I know of no similar experiments carried out with the dust of infected cowsheds on these lines, but Riddoch (7) found the walls of cowsheds in front of cows suffering from tuberculosis of the lungs bespattered with purulent matter in which he found the tubercle bacilli by microscopic examination. In 10 out of the 12 instances quoted the presence of tuberculosis was confirmed by post-mortem examinations. The various parts of a tuberculous animal's anatomy from which tubercle bacilli can escape or be thrown off, so as to be liable to be a source of infection to others, are practically all the parts of the body liable to become diseased and having natural outlets—so-called "open" tuberculosis; these are the lungs, alimentary tract, udder, genital and urinary organs. As pointed out by Riddoch, specks of matter containing tubercle bacilli are coughed up by cows affected with tuberculosis of the lungs and throat. Investigations by Schroeder (8) appear to show that the commonest way for tubercle bacilli to pass from the tuberculous bodies of cows is with their fæces. That this would be probable in the case of "shooters" is obvious, but Shroeder makes the following startling statement: "Among tuberculous dairy cows that retain the appearance of health and are not known to be affected until they are tested with tuberculin, 40 per cent. or more actively expel tubercle bacilli from their bodies in a way dangerous to the health of other animals and persons." Attention to the expulsion of tubercle bacilli from cows suffering from tuberculosis of the intestines has been drawn by Bang, Eber, and others. Bang (9) also states that he is sure tuberculosis of the womb is a very common and very dangerous form of tuberculosis, being accompanied generally by discharges of putrid matter in which tubercle bacilli can be found under the microscope, M'Fadyean (10) found tubercle of the uterus by post-mortem examination in 2 out of 6 cases of advanced tubercular disease in cows. In tubercular disease of the kidneys it is well known that the urine is infective, although to judge from the few accounts in English professional journals, tubercular disease of the kidneys in bovines appears to be rare. Walley and M'Fadyean have mentioned it and others, including the writer, have met with it at post-mortem examinations. In "excretion" tubercle of the kidneys in human beings, Walsham (11) found large numbers of tubercle bacilli in the uriniferous tubules, and according to Horton Smith (quoted by Walsham) tubercle bacilli multiply whilst in the bladder. There is no doubt, whatever, but that in tuberculous disease of the urinary organs tubercle bacilli are present in the urine which may thus become infective to other animals.

But experiments go to prove that in advanced cases of tuberculosis the urine is infective even when no disease is recognisable in the kidneys. (Foulerton and Hillier) (12) found "that in 50 per cent. of 18 fairly advanced cases of tubercular pulmonary phthisis the urine contained tubercle bacilli, such organisms being virulent for the guinea pig by inoculation. In 6 of the 9 cases, absence of tubercle of the urinary tract was proved post-mortem, the remaining 3 patients leaving hospital alive. In none of the 9 cases were tubercle bacilli discovered microscopically, but in another (case 19) tubercle bacilli were found, and at post-mortem examination tuberculous lesions were found in the kidneys. These facts show that a general blood infection, as evidenced by thepresence of tubercle bacilli from pulmonary phthisis in the urine, is more common than is supposed, but that the bacilli are only present in small numbers, that there is no tendency to multiply but are eliminated by the kidneys, the latter showing but a slight tendency to become affected, probably due to auto-immunisation."

Experiments carried out by the writer and Drs Robertson and Hector at the Bacteriological Laboratory at Sheffield in 1901-2 in connection with the urine from tuberculous cows, appear to confirm the results obtained by Foulerton and Hillier. From 5 cows suffering srom tubercle in the udder, the urine was taken under strict antiseptic precautions. Immediately after death the bladder in each instance was ligatured and removed and then taken to the laboratory. On arrival there the urine was removed from the bladder and centrifugalised for 15 minutes and a small quantity of the sediment thus obtained was mixed with 2 c.c. of sterile water and injected into guinea pigs by Dr. Robertson and Dr. Hector. In three of the cases experimental tuberculosis in the guinea pigs was the result, the lesions showing from 6 to 8 weeks after inoculation. In each instance the kidneys and bladder were examined macroscopically but no sigus of tubercle could be found.

A review of the "outlets" of tubercular infection just enumerated makes it apparent that cowsheds occupied by tuberculous cows must be pregnant with tubercle bacilli capable of infecting healthy cattle introduced into them, but it does not elucidate the path of infection in such healthy cattle. Koch (13) proved that infection by inhalation can take place, so confirming the previous experiments of Tappeiner who produced tuberculosis in 10 out of 11 dogs by causing them to inhale a vapour composed of sterile water mixed with phthisical sputum. Tappeiner's servant—a robust man, 40 years of age, and free from hereditary taint, contracted acute pulmonary phthisis by going into the cage which was used for inhalation experiments and died in 14 weeks.

On the other hand, Salmon, Sims Woodhead, and St. Clair Thompson hold that the lungs may become infected by contaminated food, the infection passing through the lymphoid tissue of the tonsil on to the pharyngeal, tracheal, bronchial and mediastinal lymphatic glands to the lungs (14), Bougert (15) considers that "with older cattle the transmission of tuberculosis mostly takes place through aerogenous infection, in consequence of sound animals living in close contact with diseased ones in byres. The prevalence of tuberculosis of the bronchial glands and the lungs among older cattle, indicates this. Intestinal infection chiefly occurs among calves and swine." Calmette and Guerin (16) after carrying out a series of experiments on goats, young cattle, and cows state that "pulmonary tuberculosis originates frequently, if not exclusively, in the intestines, that the penetration of tubercle bacilli through the intestine can be effected without producing appreciable lesions of the intestinal mucous membrane, or of the mesenteric glands, and that, of various methods of infection, ingestion is that which most often and most speedily sets up tuberculosis in the glands annexed to the lungs and in the lung itself." These experimenters explain away the successful inhalation experiments by "the supposition that the virulent germs deposited in the upper respiratory passages or expelled from the bronchial tubes with the dust-laden cells, could have been carried into the digestive canal in the swallowed saliva."

Leaving the controversial method of infection by inhalation it appears to be generally agreed that healthy animals can be infected with tubercle by feeding on tuberculous material. Experimentally it has been proved by Martin, Woodhead, Gratia, and others. Martin (17) found that by feeding pigs, guinea-pigs, and rabbits with material (sometimes meat, sometimes milk) derived from a tuberculous animal, a certain percentage was found to become tuberculous; of pigs, 36 per cent. (5 out of 14); of guinea-pigs, 16 per cent. (24 out of 145); of rabbits, 15 per cent. (2 out of 13). Woodhead (18) gave manifestly tuberculous matter (uncooked) to various animals and found that it gave rise to tuberculous disease in all the pigs (7) and all the cats (5) that received it, and in 50 guinea-pigs out of 76. Gratia (19) stated that he had fed 16 monkeys with the milk of tuberculous cows and that 14 of them died from tubercular disease. There is no doubt that the milk from cows suffering from tubercular mastitis is highly infective, and its ingestion by young animals such as calves, pigs, and colts is a frequent means of infection in such animals.

PATHOLOGY.

The development of tubercular disease is concisely put by Ostertag (32) in the following quotation:—

"In the living tissue the tubercle bacilli exercise a slow but progressively destructive action through their constant proliferation. With regard to the details of the pathogenic action of the tubercle bacilli, the excellent investigations of Baumgarten give us a deeper insight, after (? since) the nature of the tubercle bacillus has long been known pathologico-anatomically, as a result of numerous thorough and clever investigations. Inoculated tubercle bacilli at first multiply at the point of inoculation and penetrate the leucocyte wall set up in consequence of the operation, From the sixth day on, in case of inoculation into the eye, one observes the first epitheloid cells, the first typical elements of the tubercle, which arise from fixed tissue cells, as a result of the specific irritation of the tubercle bacilli. With increasing multiplication of the bacilli, the further formation of epitheloid cells ceases. Those already formed, however, swell, become multi-nuclear, and, as a rule, giant cells are formed within the tubercle. The formation of giant cells fails to occur only in case of extensive penetration of the tubercle bacilli or of the penetration of very virulent bacilli. In tuberculosis of cattle, however, one always finds giant cells in large numbers. Simultaneously, a sharp connective tissue delimitation of the the small tubercle becomes apparent. This, in contrast to the condition in man, attains in domesticated animals a considerable thickness in certain organs.

The tubercle thus formed is non-vascular. Its existence is, therefore, limited. It regularly becomes affected with regressive metamorphoses, caseation and calcification. In cases of exclusive infection with tubercle bacilli, suppuration never occurs. This is always produced by a simultaneous, so-called, mixed infection with putrefactive bacteria.

Caseation in the larger tubercles becomes macroscopically visible as a result of a cloudiness in the centre. Calcification is distinguished by a grating sound on making a section with a knife, and effervescence after the addition of acids. Tuberculous primary infections may be rendered harmless for the organism and may heal in consequence of calcification. In other cases, however, new tubercles constantly appear in connection with the degenerated ones, so that finally extensive pathological products arise from these invisible processes."

Tubercle bacilli upon getting settled in any part of the body begin to multiply and set up irritation. The result is that the defensive forces of the body, the leucocytes or white blood cells, are attracted to the part, and there is also a proliferation of the tissue cells of the part affected, the surrounding cells thus forming a small nodular tubercule. The latter grows and becomes visible to the naked eye as a greyish-white speck, about the size of a millet seed. This continues to grow, in the chronic form, and joins with others to form larger nodules varying in size up to that of a walnut or the size of a man's fist, or even larger. In most cases the defensive forces are so strong, that the tubercle becomes surrounded by fibrous tissue which cuts off its blood supply and causes retrogressive changes. In such cases upon section the centre of the tubercle may be yellow and cheese-like, due to fatty degeneration. In older nodules when section is made a gritty sensation is imparted to the knife caused by calcification. The retrogressive changes may be stated to be three—necrosis followed by caseation, and later by calcification.

In acute cases of tuberculosis due to blood infection immense numbers of tubercles may begin to develop in all parts of the body, forming what is known as acute miliary tuberculosis. This is a fatal form, and in nature supervenes upon the chronic nodular form due to an escape of tubercle bacilli into the blood vessels. Most of these bacilli get imprisoned in the lungs, hence miliary tuberculosis is best seen in these organs. There is no doubt, however, that in such cases the infection is general throughout the body, even the muscular tissue itself being invaded. The animal so affected generally dies quickly, due to pulmonary changes, and before the miliary tubercles in other parts of the body have time to materially develop. In chronic cases tubercular nodules may be met with in all the organs of the body. They may be few in number and small in size. On the contrary, particularly in the pleural and peritoneal cavities they may be numerous and coalesce to form grape-like masses (perlsucht). When affecting mucous membranes, caseated tubercles often partially disintegrate to form tuberculous ulcers, such as are met with in intestinal tuberculosis of cattle.

Lesions.

The lesions in congenital tuberculosis are of interest owing to the path of infection, the bacilli being carried by the blood-stream to the fœtus from a previously diseased placenta and uterus of the dam. M'Fadyean (20) made post mortem examinations of several cases of congenital tuberculosis in calves and found lesions in the liver, spleen, lungs, heart, kidneys and lymphatic glands, and stated that "in the new born calf tuberculosis is generalised in the proper sense of that word, and the lesions as a rule, have precisely the distribution which one could have predicted, given the presence of tubercle bacilli in the blood of the umbilical vein." Bang (21) gives the proportion of congenital tuberculosis in calves as not more than 0·33 per cent of calves slaughtered. In all cases of tuberculosis of extra-uterine infection the lesions are generally divided into two classes, generalised and local. Ostertag (22) states, "we commonly characterise as local diseases those which are restricted in an anatomical sense to one organ. In the case of tuberculosis, we extend the meaning of the local character, since this condition is set in contrast with dissemination of the disease throughout the whole body. The latter condition, however, is possible only through the aid of the systemic blood circulation. Tuberculous processes, therefore, are characterised as local in the broader sense so long as a mere extension or distribution has taken place through the lymphatic vessels, and the general circulation is not concerned in the dissemination of the tuberculous virus. In cases where the systemic blood has become the carrier of the virus, we characterise this condition as generalised or general tuberculosis (Weigert). . . General tuberculosis appears in two principal forms; a slight infection of the blood leads to the formation of isolated tubercles in various organs; an extensive infection, to the eruption of inumerable tubercles in the majority of the organs. In the first case small tubercles commonly grow to become large tubercles or caseous foci by peripheral expansion, since in such cases infection of the blood appears clinically and therefore, in and of itself, gives no occasion for slaughter (chronic general tuberculosis). In the latter case, on the other hand, tubercles are often observed in a but slightly altered condition, since this form of generalisation, as a rule, gives cause for slaughter (acute miliary tuberculosis)." Although some other writers support Ostertag in drawing a distinction between acute and chronic generalisation in tuberculosis, M'Fadyean (23) does not agree with them. After studying intra-uterine infection in calves, and carrying out experiments on rabbits, guinea-pigs and cattle, he sums up the results of his enquiry as follows.

(1) "The never-failing evidence of generalisation is the presence of tubercles of approximately equal size scattered throughout the entire spongy lung tissue.
(2) In the absence of the lungs, the other organs, and the carcase generally do not afford to a naked eye examination reliable evidence as to whether generalisation has taken place or not.
(3) In the case of generalised tuberculosis either the kidneys, liver or spleen, or the whole of these at once, may be free from macroscopic lesions although the lungs contain myriads of embolic tubercles visible to the naked eye.
(4) The macroscopic tubercles which are met with in the liver, spleen, kidneys, and lymphatic glands generally, are as a rule due to lymphatic affection, and afford no evidence of generalisation by way of the blood-stream."

Later M'Fadyean (24) states—"In the so-called cases of chronic generalised tuberculosis observed in adult animals the spleen is seldom or never affected, although when any considerable number of bacilli gain access to the arterial blood it is the organ most constantly involved in the disease. This is most clearly seen in cases of intra-uterine infection. It is doubtless equally true of post-natal infection, but it escapes observation because (1) in many cases of generalisation occurring in the adult only a small proportion of bacilli escape arrest in the pulmonary capillaries, and (2) because generalised tuberculosis of the adult animal is almost invariably fatal in consequence of the pulmonary lesions, before the tubercles in the spleen have had time to attain macroscopic dimensions."

The distinction between generalised and local tuberculosis is a very important one in the inspection of tuberculous carcases intended for human food, because according to Ostertag, Johne and Ziegler, tubercle bacilli gain entrance into the musculature, "the meat of traffic" only by the aid of the circulating blood, thus rendering the meat infective and injurious to health.

Time and space will not permit reference to the tubercular lesions as found in the different organs of the bodies of animals, but the following table compiled by M'Fadyean (25) after making 37 post mortem examination of natural cases of tuberculosis in the ox shows the seats of the most common lesions.

TABLE I.

Organs in which Tuberculous lesions were found :—

1 Bronchial and mediastinal lymphatic glands and left lung.
2 Bronchial and mediastinal lymphatic glands.
3 Left bronchial glands.
4 Bronchial, mediastinal, mesenteric glands, and both lungs.
5 Bronchial, and pharyngeal glands, and right lung.
6 Bronchial, mediastinal, and mesenteric glands, right lung, pleura, and glands of liver.
7 Bronchial and mediastinal glands.
8 Pharyngeal and mediastinal glands.
9 Bronchial, pharyngeal, mediastinal, and mesenteric glands.
10 Bronchial, mediastinal, mesenteric, and hepatic glands, and right lung.
11 Bronchial and mediastinal glands, and right lung.
12 Both lungs and mediastinal glands.
13 Bronchial and mediastinal glands.
14 Bronchial and mediastinal glands.
15 Bronchial and mediastinal glands.
16 Bronchial, mediastinal, pharyngeal glands, and right lung.
17 Bronchial and mediastinal glands, and left lung.
18 Left bronchial glands.
19 Bronchial and mesenteric glands, and left lung.
20 Bronchial, mediastinal, hepatic, and mesenteric glands, and both lungs.
21 Right bronchial glands.
22 Mesenteric glands, and both lungs.
23 Bronchial, mediastinal, and mesenteric glands.
24 Mediastinal glands.
25 Bronchial and mediastinal glands.
26 Bronchial and mediastinal glands.
27 Right bronchial glands.
28 Bronchial and mediastinal glands.
29 Bronchial, pharyngeal, mediastinal, hepatic, and mesenteric glands, and both lungs.
30 Bronchial, mediastinal, and mesenteric glands, and right lung.
31 Bronchial and mediastinal glands.
32 Bronchial and mediastinal glands, and right lung.
33 Bronchial, mediastinal, mesenteric glands, and both lungs, pleura, peritoneum, and left mammary lymphatic gland.
34 Mediastinal glands.
35 Bronchial glands.
36 Bronchial, mediastinal, and splenic glands, liver and right lung.
37 Bronchial, mediastinal, mesenteric glands, and right lung.

An analysis of the above shows tuberculosis in the—

Bronchial lymphatic glands	32	=	86	per cent.
Mediastinal lymphatic glands	29	=	78	,,
Mesenteric lymphatic glands	11	=	29	,,
Pharyngeal lymphatic glands	3	=	8	,,
Hepatic lymphatic glands	3	=	8	,,
Splenic lymphatic glands	1	=	2	,,
Supra-mammary lymphatic glands	1	=	2	,,
Lungs	16	=	43	,,
Pleura	2	=	5	,,
Peritoneum	1	=	2	,,
Liver	1	=	2	,,

Stockman (26) [quoted by Villar] found the percentage of organs and tissues affected as follows :

TABLE II.

Lungs in	93	per cent.
Pleura	80	,,
Bowel and mesenteric glands	65	,,
Peritoneum	61	,,
Liver	54	,,
Udder	23	,,
Spleen Capsule	21	,,
Pericardium	5	,,
Kidney	5	,,
Uterus	3	,,
Bones	1	,,

The following tables compiled by Trotter (27) are of interest showing as they do the number of carcases of home and foreign animals slaughtered in the Glasgow abattoirs which were totally or partially destroyed on account of tuberculosis during the years 1901, 1902, and 1903, the prevalence of tuberculosis among home reared and foreign animals respectively, and the seat of the tubercular lesions in each animal affected.

TABLE III.

Showing the number of carcases of home and foreign animals slaughtered in the Glasgow abattoirs which were totally or partially destroyed on account of tuberculosis during the year 1901, 1902. 1903.

			CATTLE.								
			Oxen.	Bulls.	Cows.	Heifers.	Calves.	Total.	Swine.	Sheep.	Total.
Home.	1901	Totals	15	23	918	11	3	970	73	0	1043
		Partial	35	26	597	6	0	664	1156	0	1820
	1902	Totals	33	27	1128	13	1	1202	61	0	1263
		Partial	60	38	749	17	0	864	1305	0	2169
	1903	Totals	33	23	1012	28	4	1100	75	1	1176
		Partial	73	38	638	22	0	771	1905	0	2676
	1901-3	Total	81	73	3058	52	8	3272	209	1	3482
		Part'l	168	102	1984	45	0	2299	4366	0	6665
Foreign.	1901	Partials	2	7	0	0	0	9	0	0	9
	1902	Totals	2	0	1	0	0	3	0	0	3
		Partials	3	4	2	0	0	9	0	0	9
	1903	Totals	1	2	0	0	0	3	0	0	3
		Partials	5	6	0	0	0	11	0	0	11
	1901-3	Totals	3	2	1	0	0	6	0	0	6
		Part'ls	10	17	2	0	0	29	0	0	29

TABLE IV.

Showing the prevalence of tuberculosis among (*a*) the animals reared in this country, and (*b*) the animals landed at the Foreign Animals Landing Wharf, Glasgow, in 1903, and the measures taken with those carcases affected.

		TUBERCULAR.							
				Measures Adopted.					
Species.	Slaughtered.	Affected.		Carcases partially destroyed.		Carcases totally destroyed		Carcases passed	
Home	No.	No.	P.C.	No.	P.C.	No.	P.C.	No.	P.C.
Cattle	47,362	7484	15·80	771	10·30	1096	14·64	5617	75·06
Calves	2,325	7	·30	—	—	4	57·14	3	42·86
Sheep	271,385	1	·0003	—	—	1	100·00	—	—
Swine	53,483	2132	3·98	—	—	75	3·52	2054	96·48
Foreign									
Cattle	39,638	442	1·11	11	2·49	3	·68	428	96·83
Calves	2	—	—	—	—	—	—	—	—
Sheep	11,938	—	—	—	—	—	—	—	—

TABLE V.

Recording the seat of the tubercular lesions in the different species of animals affected :—

Species.	Pleural cavity.	Peritoneal cavity.	Both cavities.	Other parts of body.	TOTAL.
Home :					
Oxen	474	77	275	297	1123
Bulls	512	54	222	180	968
Cows	2081	251	2657	247	5236
Heifers	61	6	66	24	157
	3128	388	3220	748	7484
Calves	3	—	4	—	7
Sheep	—	—	1	—	1
Goats	—	—	—	—	—
Swine	40	109	188	1796	2133
	3171	497	3413	2544	9625
Foreign :					
Oxen	147	4	32	116	299
Bulls	78	4	16	39	137
Cows	3	—	—	—	3
Heifers	1	—	1	1	3
	229	8	49	156	442

Following are tables compiled by King (28) relating to the inspection of meat at the Metropolitan Cattle Market in 1901, giving the condemnations for tuberculosis, the seat of the lesions, and the estimated loss to the owners.

TABLE VI.

	Cows.	P/c.	Bulls.	P/c.	Oxen.	P/c.	Heifers.	P/c.	Calves.	P/c.	TOTAL
No. of animals on which P.M. examinations were made	500	—	113	—	131	—	53	—	941	—	1738
No. of animals free from disease	266	53·2	93	82·3	116	88·55	42	79·24	929	98·72	1146
No. of animals tuberculous	234	46·8	20	17.7	15	11·45	11	20·75	12	1·27	292
No. with lesions in abdominal and thoracic regions	129	25·8	9	7·96	9	6·87	8	15·09	—	—	155
No. with lesions in thoracic region only	87	17·4	7	6·19	3	2·29	3	5·66	—	—	100
No. with lesions in abdominal region only	18	3·6	4	3·0	3	2·29	—	—	—	—	25
No. with lesions in mammary glands	11	2·2	—	—	—	—	—	—	—	—	11
No. with lesions in testicles	—	—	1	·87	—	—	—	—	—	—	1
No of carcases affected	67	13·4	5	4·42	6	4·58	5	9·43	5	·53	88
No. of carcases totally destroyed	35	7·0	3	2·66	1	·76	1	1·88	2	·21	42
No. of carcases partially destroyed	32	6·4	2	1·77	5	3·81	4	7·54	3	·31	46

All percentages calculated on number of carcases examined.

Table VII

Weight and Value of Meat and Viscera destroyed.

	Weight of meat in lbs.		Price per lb.				No. whole viscera		Price each.				
			d.	£	s.	d.			s.	d.	£	s.	d.
Cows	16,832	at	4	280	10	8	129	at	16	6	106	8	6
Bulls	2,376		4½	44	11	0	9		16	6	7	8	6
Oxen	1,152		5½	26	8	0	9		16	6	7	8	6
Heifers	748		5½	17	2	10	8		16	6	6	12	0
Calves	480		4½	9	0	0	2		5	6		11	0
Total	21,588			£377	12	6	157				£128	8	6

	No. of abdominal destroyed.		Price each				No. thoracic organs destroyed.		Price each.					Total value.		
			s.	d.	£	s.			s.	d.	£	s.	d.	£	s.	d.
Cows	18	at	14	0	12	12	87	at	2	6	10	17	6	410	8	8
Bulls	4		14	0	2	16	7		2	6		17	6	55	13	0
Oxen	3		14	0	2	2	3		2	6		7	6	36	6	0
Heifers	—		—		—		3		2	6		7	6	23	2	4
Calves	10		2	6	1	5	2		3	6		7	0	11	3	0
	35				£18	15	102				£12	17	0	£537	13	0

The following table compiled from Mr. King's reports (as printed in *The Meat Trades' Journal*) 1901-2-3-4 and 1907, to the Cattle Markets Committee shows the number of animals slaughtered, the total number of carcases completely and partially condemned as unfit for human food, the number condemned as tuberculous and the percentage of the latter to total condemnations, also the number of cows condemned and the percentage to total condemnations. King's Reports do not give the particulars as to the different animals condemned for tuberculosis, but by comparing the percentage of cows condemned and the percentage of tuberculosis with the total condemnations the inference is obvious.

TABLE VIII.

	Number of Animals Slaughtered.				
Year	Cattle.	Calves.	Sheep.	Pigs.	Total.
1901	18,932	8,781	100,945	39,279	167,937
1902	23,666	13,746	103,587	34,894	175,893
1903	13,639	6,224	88,571	36,385	144,819
1904	15,296	4,291	84,033	77,233	180,853
1907	22,303	106,815	12,599	35,065	176,782

NO. OF CARCASES CONDEMNED.

	Cows.		Heifers.		Bulls.		Oxen.		Calves.		Sheep.		Pigs.		Total condemnations.	Tuberculous.	P/c	T'tl cows condemned.	P/c.
	C.	P.	C.	P.	C.	P.	C.	P.	C.	P.	C.	P.	C.	P.					
1901	750	258	14	—	9	2	12	6	9	—	91	5	62	4	1222	730	59	1008	82
1902	660	256	9	—	7	4	8	9	18	—	143	3	136	4	1257	754	60	916	73
1903	369	228	1	—	2	3	7	—	9	—	75	6	203	18	921	558	60	597	65
1904	546	176	9	—	3	4	4	1	20	—	103	1	321	38	1226	724	59	722	58
1907	585	188	8	—	4	1	4	—	7	1	49	1	195	—	1044	609	58	773	74

C.—Completely condemned. P.—Partially condemed

The frequency of tuberculous attacks in the different groups of lymphatic glands is shown in the following table compiled by Stroh (29) and is of interest in inspecting tuberculous carcases for human food, showing as it does how often the muscular glands are affected.

TABLE IX.

	Prepectoral.		Axillary.		Crural.		Popliteal.		Ischiatic.	
	No.	P/c.	No.	P/c.	No.	P/c.	No.	P/c.	No.	P/c,
Oxen	12	37·50	4	12·50	6	18·76	5	15.62	5	15;62
Bulls	11	33·33	2	6·06	6	18·19	9	27·27	5	15·15
Cows & Heifers	50	24·03	9	4·32	52	25	60	28·85	37	17·80
Calves	53	40·78	9	6·93	29	22·30	31	23·05	8	6·14
Pigs	142	52·59	—	—	92	34·08	36	13·33	—	—

There is however no doubt that the lesions in the udders of milking cows are of most importance at the present time and they probably cannot be better described than in the following two quotations.

M'Fadyean (30) states that "In a very considerable proportion of advanced cases of tuberculosis in the cow the udder is affected. As a rule the condition is associated with tuberculous peritonitis or other extensive tuberculous lesions within the abdomen. There is often evidence that the disease has begun at the upper part of one or other quarter, and one or other supramammary gland is sometimes found to contain tuberculous lesions of considerable standing, while the udder itself shows only recent lesions or is quite healthy. All these facts are best explained by supposing that the gland is usually invaded in a centrifugal direction by way of its lymphatic vessels. In harmony with this view is also the fact that the lesions generally takes the form of a diffuse interstitial inflammation of the gland tissue, and not a tubercular (in the anatomical sense) or nodular form such as one would expect if the disease were due to the embolic arrest of bacilli in the capillary vessels of the udder. In occasional cases, however, what appear to be the oldest lesions in the udder are found in connection with the milk-cistern, and the lower part of the gland, and it is conceivable that in these cases infection may have taken place by way of the teat canal, perhaps through the agency of a milk syphon soiled with tubercle bacilli."

Henderson (31) states that in a case of tubercular mastitis in an Ayrshire cow he found that "The carcase exhibited generalized tuberculosis, and the disease had infiltrated the udder. The right half of it was markedly enlarged, particularly the posterior quarter. The skin covering these quarters was quite loose, and felt as if it intimately covered the indurated parenchyma, without the intervention of much subdermal areolar tissue. The indurated parenchyma felt stringy and ridged, but not nodular as might have been expected. This induration felt much more compact and hard than cases of mastitis of other origin. The most diagnostic tubercular feature was that the infiltration had accurately followed the original outlines of the quarter, so that the adjacent corners of the quarters on the lower surface could be distinctly felt where the transverse septum dividing the quarters, and the longitudinal septum dividing the two halves, approached each other. The ridge bounding the quarters along the longitudinal septum was also distinctly palpable. In ordinary mammitis the effusions and other inflammatory products practically obliterate these corners and ridges. Where the tuberculous induration becomes compact there is seldom any exudation between the skin and the indurated parenchyma. The non-nodular surface of the induration is not at all uncommon in tubercular mastitis. The compact induration did not extend quite to the base of the udder. The soft part had a firmer consistency than the normal tissue, but could not, if found apart from the compact induration, be diagnosed as tubercular. In a quarter or part of a quarter thus invaded, *i.e.*, before the interstitial tissue has become markedly developed and compact, the milk production is not arrested, but stimulated, and bacilli are passed out with the milk.

A section was made of the hind quarter from the teat to the base. The lower two-thirds of the cut surface disclosed the thoroughly invaded area in a solid block. The subdermal areolar tissue was not invaded. In colour this solid induration was only of a slightly deeper yellow than the normal gland tissue. Each lobule of acini was distinctly outlined, giving the surface a mosaic appearance, each piece in the mosaic being about the size of a split grain of pearl barley. The dividing lines between the lobules, however, were very faintly marked, and the pieces bulged very slightly upon the cut surface. Films from this compact area were exceedingly rich in tubercle bacilli.

The area of softer consistency did not differ from normal gland tissue in colour. Films made from this area showed not nearly so many bacilli as those from the compact tissue. This is the primary stage of the invasion, and by gradual transformation it passes into the secondary stage, which is the compact induration. Where the whole quarter is composed of the hard compact tissue the lesion has attained considerable age, and it is only then that calcification sets in. This third stage begins as a rule in the neighbourhood of the teat and advances upwards. It can be discovered by the grating sound emitted on section. When calcification is present the interlobular connective tissue is markedly increased, and can be seen by the naked eye, clear white, and tough. The parenchyma then shows the unmistakable yellow tuberculous character. This advanced condition is rather rare."

PREVALENCE.

Little need be written upon the prevalence of tuberculosis either in human beings or animals. In the human subject the disease is very prevalent, one seventh of mankind, it is stated, die of one or other form of tuberculosis. In this country 60,000 persons die annually affected with the disease; the chief seat of the lesions being the lungs and intestines. There has been, however, a great reduction in the mortality from phthisis during the last 50 years, probably due in a large instance to better sanitation and a wider knowledge of preventive measures. Unfortunately it is not considered that tuberculosis in infants has decreased at a proportionate rate. From evidence supplied by Dr. Tatham, Superintendent of Statistics in the General Register Office to the 1906-8 Royal Commission on Tuberculosis, the Commissioners stated in their Report that " whilst death from tubercular diseases in all its forms and at all ages, has steadily fallen from 3,483 per million during 1851-60 to 2,122 during 1891-95—a diminution of 39.1 per cent. . . . when we come to examine that form of tubercular disease, namely, tabes mesenterica, which is believed to be mainly due to infection received by the digestive tract, we found that whilst at the age period 0-5 years, when milk forms so important an article of diet, the rate of death per million living has shown, first increase, then decrease, yet the rate which stood at 1,625 during 1851-60 had only fallen to 1,577 for the period of 1891-95, a diminution of but 3.0 per cent."

In some of the domestic animals tuberculosis is very prevalent, being most common in bovines and pigs, more rare in horses and dogs, seldom being seen in sheep. As the flesh of horses and dogs is not commonly used for human consumption in this country, tuberculosis amongst those animals require no further comment so far as tuberculous meat is concerned. In cattle, the disease is very prevalent. M'Fadyean (33) gives 1,389 cattle as reacting to the tuberculin test out of 4,379=31·7 per cent. Later (34) he gives 4,105 reactions out of 15,392 tests=26 per cent. Ainsworth Wilson (35) repeatedly found 20 per cent. of heifers react before being tied up; six months later 40 per cent. react. In Germany it is stated (*Daily Express*) nearly 50 per cent. of the cows slaughtered during 1906 and 1907 were found after slaughter to be suffering from tuberculosis. C. Hunting(36)—quoted by Dollar—examined 4,000 English cattle and found 20 per cent. tuberculous. Dollar also supplies a series of figures relative to Denmark (31 per cent.), Sweden (42 per cent.), Norway (8.4 per cent.), Belgium (60 per cent.), etc., as found by reactions to the tuberculin test.

As pointing out the amounts of disease at different ages, the following table by Bang (37) is instructive.

TABLE X.

	Under half-year.		About 1 year.		About 2 years.		Above 2½ years.	
	Sound.	Reacting.	Sound.	Rectg.	Sound.	Rectg.	Sound.	Rectg.
No. of animals	5793	1077	6832	2972	4638	3225	10,833	11,129
Percentage	84·3	15·7	69·7	30·3	59·4	40·6	49·3	50·7

Tuberculosis is so uncommon in the sheep that so far as meat inspection is concerned it may be looked upon as a negligeable quantity and only of interest as the exception which proves the rule.

In pigs the disease is far from uncommon. In young pigs the disease often develops rather rapidly and is usually considered due to infection by the alimentary tract, the animals being fed on tuberculous meat and milk, the latter being generally obtained from cows with tuberculous udders, although it must not be forgotten that occassionally sows are known to suffer from tuberculosis of the mammary glands, when the milk secreted would probably be infective.

Ostertag (38) states that next to cattle swine are most frequently affected with tuberculosis, and ascribes the infection due to infected milk, and quotes experiments by Bollinger to that effect. He puts the percentage of cases from 0.21 to 7.7, and states that following upon the erection of creameries tuberculous infection in pigs is alarmingly increased by feeding the raw by-products to the pigs. In Denmark, Bang and others, noted this increase of tubercular disease in pigs, and in 1899 the Danish Government passed a law making it illegal to return any separated milk from the creameries to farmers until it had been previously boiled. As in cattle, the percentage of tuberculosis in pigs varies considerably. In Denmark it is stated to be as high as 14 per cent. Reports from European abattoirs show returns as high as 5.5 to 7.5 per cent. of all pigs slaughtered. In Glasgow 4.24 per cent. is said to be affected. In the United States 1.5 per cent. of all pigs slaughtered are found to be tuberculous but Mohler and Washburn (39) states that in three cities in one of the leading dairy States the figures are 3.1, 3.4 and 6.4 per cent. respectively

Diagnosis.

By ordinary physical methods of diagnosis it is quite impossible to state whether the disease is present in any given number of animals. M'Fadyean (40) thinks that without tuberculin one cannot in 80 per cent. of the case of tuberculosis in existence arrive at any conclusion at all. There are often signs of wasting, a cough or difficult breathing, a harsh sound in the throat, enlargement of the glands of the throat or udder, signs of dulness in the chest upon palpation or ausculation, diarrhœa in intestinal tuberculosis, discharges from the vagina, hypertrophy and chronic induration of the udder, etc., which may lead the practitioner to suspect tuberculosis in many individual cases, but except in a very few is a diagnosis to be made with certainty.

There are other methods which can be employed, such as the following:—

Microscopic examination of the expectoration or discharges, such as those from the throat or vagina, obtaining the sputum from the pharynx by swabbing the throat, or from the trachea after tracheotomy.

In the case of diseased udder the signs present are often sufficient to give a fairly accurate diagnosis, although in many instances, owing to the chronic nature of the invasion, the disease may be present for some time before showing any marked external signs.

M'Fadyean (41) gives the following characters as serving to broadly distinguish tuberculous mastitis, (1) that it is always insidious in its onset, (2) that its course is always chronic, (3) that it never ends in resolution, (4) that it steadily adds to the volume and density of the invaded quarter, and (5) that at the outset of an attack the milk is not notably altered either in quantity or appearance. There is no doubt that in the vast majority of cases the above hold good; the first invariably so; the second usually, but it is by no means unusual to find tuberculous mastitis much more progressive in some cases than others, with a corresponding quicker increase in size, and a quicker change in the physical characters of the milk, and a rapid diminution of the quantity secreted. The writer has only known one case of undoubted tubercular disease of the udder which did not comply with characters three and four. That was a young cow, which after calving (with a tuberculous udder) was dried off for feeding. Five months later a manual examination showed the diseased condition to be apparently completely checked, and the volume and density of the affected quarter to have considerably diminished.

Tubercular mastitis never comes on suddenly, it is not painful upon manipulation, there is a distinct induration of the affected part without heat, the swelling depends upon the extent of the disease; there is usually some amount present The skin is loose from the affected part underneath. The induration is usually hard, board-like and consistent throughout the diseased part, in some cases it is more nodular to the feel than in others. At the first onset the milk is unaltered, later it is changed, becoming whey-like in appearance with flocculent particles floating in it, particularly in that first drawn, and which later sinks as a sediment to the bottom of the vessel containing it.

In tubercular mastitis tubercle bacilli are probably always present and occasionally in sufficient numbers to be discovered by the microscope, upon examining coverglass films properly prepared from the sediment and stained by the Ziehl-Nielsen method. Failure to find the bacilli does not warrant a negative diagnosis however, and to give a positive proof of the presence or absence of tubercle bacilli recourse has to be had to inoculation of the sediment from the suspected milk into guinea-pigs, an experiment which of course can only be carried out in a bacteriological laboratory, and by an investigator properly licensed under the vivisection act.

The inoculation test can be carried out by several methods; subintaneous, intra-peritoneal or intra-muscular—some claim the latter to be the most delicate test and the quickest. Either should give a final decision in three weeks for a sample from a suspicious udder, or in four weeks in the case of mixed milk from a whole herd of cows.

There are some diseases and conditions which may be mistaken in the living animal for tuberculosis. For instance, every animal that is thin is not tuberculous: Johne's disease may be mistaken for tubercular enteritis. Actinomycosis may affect the glands of the throat or the udder. In the udder, during the later stages of an acute mastitis the udder is hard and swollen, and the milk altered in appearance, or the mastitis may have been of a chronic interstitial character from the commencement, the signs present being practically identical with tuberculosis, but no tubercle bacilli are found by microscopic examination or the inoculation test. Another confusing condition met with is apparent enlargement of one quarter of the udder, due to diseased or physical atrophy of the opposite quarter. In such cases it is always best to have the animal milked, when the consistency and size of the udder can be better judged, before coming to any conclusion.

There is still another method by which a tuberculous udder can be diagnosed, although it has not been put into practical use in this country, that is by use of the harpoon or trochar; Nocard recommended its use at the British Congress on Tuberculosis in 1901, M'Fadyean practised it on one occasion eight years earlier, and Walley suggested it in 1883. The owners of cattle would no doubt object to its use, and that successfully, as there is no power at present to compel them to allow its use, but in these days of aseptic surgery no doubt the harpoon could be used with success, and with very little, if any, risk. The harpoon would be used to extract a small amount of tissue from an udder, or tumour suspected to be tuberculous, the tissue being afterwards examined microscopically for the presence of tubercle bacilli. By this method Nocard stated he had often done in one hour what it would have taken several weeks to do by the inoculation test.

The agglutination test has been employed in the diagnosis of tuberculosis by several bacteriologists, including Arloing, Courmont, Widal, and Ravant abroad, and Horton Smith and Armit in this country. Arloing (42) stated that sero-agglutination, *well applied*, gives results which compare favourably with those of tuberculin. Rabinowitsch (43) on the other hand stated that it is not possible to diagnose tuberculosis by the positive or negative result of the agglutination test. The test that is most commonly and successfully used for the diagnosis of tuberculosis in cattle is the tuberculin test. Tuberculin is a concentrated glycerine-bouillon culture of tubercle in which the bacilli have been killed by heat. It was first introduced by Koch in 1890-91 as a curative agent for tubercular affections but was not as successful as was anticipated, although modified kinds of tuberculin are still used by some medical practitioners with varying success. As a diagnostic agent in animals tuberculin has been largely used, and is certainly the best means at hand to diagnose the presence or absence of tuberculosis in cattle. It is however not without its failings and consequently there are critics who oppose its application. In order to thoroughly test its reliability and the conditions favourable and unfavourable to its application the Royal Agricultural Society of England appointed a committee in 1900 to carry out a series of investigations and they reported as follows: (44) "With few exceptions manifest tubercular disease is discoverable at the post-mortem examination of animals in which there was a decided rise of temperature after the injection of tuberculin. As a rule no such lesions are to be found in those animals in which there is no decided rise of temperature after the injection of tuberculin; but the exceptions to this rule are more numerous than in the preceding case. Practically speaking the exceptions under each of these heads may be regarded as failures or errors in the test, but close examination of the circumstances suggests that some of the exceptions may be explained otherwise than by assuming an inconstancy of action on the part of tuberculin . . . Even when full account is taken of these possibilities of error, the committee are of opinion that tuberculin is an agent of great value, far surpassing all other methods of diagnosis, and that if properly employed it is calculated to render immense service in dealing with tuberculosis." Some of the conditions which affect the test are—excitement in the animals to be tested, interference with the temperatures of the animals and their surroundings during the test, the application of a recent previous test the length of time which has elapsed since infection took place, and the presence of very extensive old-standing tuberculosis. In the last case the animal's system is thought to be already charged with tuberculin of its own manufacture, whilst in the last but one it appears that there is a certain period after infection during which tuberculin provokes no reaction. It was at one time considered necessary to allow a lapse of at least two weeks before applying a second test, it being thought that the first test interfered with the reaction ol the second. Nocard in 1892 noticed that some degree of tolerance obtained in animals repeatedly injected with tuberculin and that the reactions became less with each injection. To obtain a second reaction in all the diseased animals Nocard considered twenty-five to thirty days should elapse between the two injections. This tolerance is said to have been taken advantage of by unscrupulous breeders to deceive buyers buying animals subject to the tuberculin test. Vallée (45) has shown that a second injection may be made in tuberculous animals in as short a time as 48 hours after the first test, and that by taking the temperatures from the second hour onwards immediately after the second test a rapid and marked rise in temperature can be detected in every case. As a rule the temperatures are taken every three hours from the 9th to the 18th or 21st hours. Vallée also advises that a double dose of tuberculin should be employed in cases where previous fraudulent testing is suspected. Tuberculin is usually injected subcutaneously, the dose being 45 to 60 minims, a rise in temperature to 104°F. or over being considered a reaction. If the temperature does not rise above 102°F. the animal is considered to have passed the test, whilst if the temperature exceeds 103°F but does not exceed 104°F the reaction is doubtful and a second test in two to four weeks time is indicated. The temperature curve is liable to interference through the animals being turned out of the shed, by exposure to cold winds or by drinking cold water, and those must be avoided to get correct results. A reaction to tuberculin is no criterion as to the extent of the tubercular disease present, it may be slight or extensive. It is of practically no value in suspected cases of tubercular mastitis, except as indicating that tubercular disease is present somewhere in the animal's system. The disease in the udder is generally accompanied by some amount of tuberculosis in the abdominal cavity, and a reaction in such cases does not decide whether the disease in the udder is tuberculosis or not.

There are two other methods of applying the tuberculin test which have lately been put into practice. One is to apply tuberculin to a small patch of skin which has previously been asepticised and scarified. In tuberculous patients a flat red papule forms in 24 to 48 hours disappearing in about 8 days. Pirquet was the first to introduce this cutaneous test, Arloing has used the test in animals without any great success. Vallée thinks the test of some value. Trotter (46), after testing 31 cows, considers the test unsatisfactory. The other method of using tuberculin was introduced by Calmette in June, 1907, and consists of applying tuberculin of a reduced strength to the conjunctiva. In tuberculous patients a conjunctivitis is produced; in healthy subjects there should be no change. The reaction commences in 3 to 5 hours, the phenomena being conjestion followed by œdema and intense redness of the conjunctiva. The maximum is reached in about 6 to 10 horses. This ophthalmic test does not appear to have been much used for cattle. Trotter got accurate results in 33 cases out of 37 cows tested, and states that he got more accurate results by using a pipette to apply the tuberculin rather than a brush. He also points out that there is no systemic disturbance caused by the test so applied, but does not consider the ophthalmic test so reliable as the subcutaneous.

COMMUNICABILITY.

The effect produced upon man and animals by the consumption of food (meat and milk), derived from tuberculous animals, has long been the subject of investigation and controversy. No less than one Departmental Committee and three Royal Commissions have been appointed in connection with the subject of tuberculosis. Brown (47) stated " Early in 1888 the Lord President appointed a Departmental Committee to consider, among other matters, the best method of dealing with tuberculosis, with a view of checking the progress of the disease; the Committee reported that, in their opinion, tuberculosis should be included in the diseases in the Contagious Diseases (Animals) Acts, for the purposes of slaughter and compensation for the seizure and slaughter of diseased animals exposed in markets or fairs," and there was also a recommendation to the effect " that it should be made an indictable offence to breed from animals which were known to be affected with tubercle."

In 1890 a Royal Commission was appointed to inquire and report what is the effect, if any, of food derived from tuberculous animals on human health, and, if prejudicial, what are the circumstances and conditions with regard to the tuberculosis in the animal which produce that effect upon man. Owing to the death of the chairman, Lord Basing, in 1894, this Royal Commission was revoked and another, composed of the same remaining commissioners was again appointed to carry on the inquiry. In 1895 they issued their Report, stating that they " obtained ample evidence that food derived from tuberculous animals can produce tuberculosis in healthy animals. In the absence of direct experiments on human subjects, we infer that man also can acquire tuberculosis by feeding upon materials derived from tuberculous food-animals. No doubt the largest part of the tuberculosis which man obtains through his food is by means of milk containing tubercular matter." In 1896 another Royal Commission was appointed to inquire into the administrative proceedings for controlling danger to man through the use as food of the meat and milk of tuberculous animals, and the Commissioners issued their Report in 1898, after thoroughly going into the prevalence of tuberculosis amongst food animals, sanitary housing of such animals, the inspection of meat and milk, and the alterations in laws and administration advocated by representatives of the various interests affected. The Commissioners made recommendations as to the provision of public slaughter-houses, the abolition of private slaughter-houses, the provision of clearing houses, the marking of inspected meat, the qualifications of meat inspectors, and rules for the guidance of meat inspectors as to the passing or condemning of tuberculous carcases. In connection with milk they recommended notification of all diseases of the udders of cows, the milk from which is offered for sale, exclusion from sale of tuberculous milk, and power to slaughter with compensation on certain lines, viz.: full value if animal is found to be not affected, and carcase value if affected. The following sanitary requirements for cowsheds were suggested :—

1. An impervious floor.
2. A sufficient water supply for flushing.
3. Proper drainage.
4. A depôt for the manure at a sufficient distance from the byres.
5. A minimum cubic contents as regards such districts (populous places) of from 600 to 800 cubic feet for each adult beast according to the average weight of the animals.
6. A minimum floor space of 50 feet to each adult beast.
7. Sufficient light and ventilation.

For the elimination of tuberculosis gratuitous tuberculin testing by veterinary surgeons at the Government expense was recommended upon condition :—

(*a*) That the test be applied by a veterinary surgeon.
(*b*) That tuberculin be supplied only to such owners as will undertake to isolate reacting animals from healthy ones.
(*c*) That the stock to be tested shall be kept under satisfactory sanitary conditions, and more especially that sufficient air space, ventilation, and light be provided in the buildings occupied by animals.

From the foregoing epitome of the Reports of the two Royal Commissions, it will be gathered that the Commissioners looked upon tuberculosis in man and animals as one and the same disease, but the only action taken by the central authorities towards combating the complaint was for the Local Government Board to make the Dairies', Cowsheds and Milkshops Order of 1899 which amended the Dairies', Cowsheds and Milkshops Order of 1885 so that for the purpose of Article 15, paragraphs (*a*) and (*b*) (dealing with the milk of a diseased cow), the word disease shall include such disease of the udder as shall be certified by a veterinary surgeon to be tubercular.

Section 15 of the 1885 Order reads as follows :—

Existence of disease among cattle.

15. If at any time disease exists among cattle in a dairy or cow-

shed, or other building or place, the milk of a diseased cow therein :—

(*a*) Shall not be mixed with other milk, and

(*b*) Shall not be sold or used for human food, and

(*c*) Shall not be sold or used for food of swine or other animals, unless and until it has been boiled.

From the above it will be seen that the Local Governmeut Board did nothing to prevent the milk of cows suffering from tuberculosis of the udder being given as food to calves or pigs, although knowing that the disease in the latter animals was probably to a large extent caused by the ingestion of such affected milk. The circular letter, however,. suggested to Local Authorities better qualifications for meat inspectors, and it was accompanied by a set of model Regulations relating to dairies and cowsheds.

Several Local Authorities were not content with the powers given them by the Local Government Board through the Dairy Orders, aud went to Parliament for additional powers to deal with tuberculous milk. Brighton, Liverpool, Manchester, Leeds, and Sheffield, were amongst some of the first towns to obtain the powers of the Model Milk Clauses. Those for Sheffield contained in the Sheffield Corportion Act, 1900, read as follows :—

NOTICE is hereby given that by the Sheffield Corporation Act, 1900, it is enacted as follows :—

130.—In this Part of this Act—

"Dairy" shall include any farm farmhouse cowshed milkstore milk shop or other place from which milk is supplied or in which milk is kept for purpose of sale :

"Dairyman" shall include any cowkeeper purveyor of milk or occupier of a dairy :

"Medical officer of health" shall include any person duly authorised to act temporarily as medical officer of health.

131.—Every person who knowingly sells or suffers to be sold or used for human consumption within the city the milk of any cow which is suffering from tuberculosis of the udder shall be liable to a penalty not exceeding ten pounds.

132.—Any person the milk of the cows in whose dairy is sold or suffered to be sold or used for human consumption within the city who after becoming aware that any cow in his dairy is suffering from tuberculosis of the udder keeps or permits to be kept such cow in any field or shed or other building along with other cows in milk shall be liable to a penalty not exceeding five pounds.

133.—Every dairyman who supplies milk within the city and has in his dairy any cow affected with or exhibiting signs of tuberculosis of the udder shall forthwith give written notice of the fact to the medical officer of health stating his name and address and the situation of the dairy or premises where the cow is. Any dairyman failing to give such notice as required by this section shall be liable to a penalty not exceeding forty shillings.

134.—(1) It shall be lawful for the medical officer of health or any person provided with and if required exhibiting the authority in writing of such medical officer of health to take within the city for examination samples of milk produced or sold or intended for sale within the city.

(2) The like powers in all respects may be exercised outside the city by the medical officer of health or such authorised person if he shall first have obtained from a justice having jurisdiction in the place where the sample is to be taken an order authorising the taking of samples of the milk which order any such justice is hereby empowered to make.

135.—(1) If milk from a dairy situate within the city is being sold or suffered to be sold or used within the city the medical officer of health or any person provided with and if required exhibiting the authority in writing of the medical officer may if accompanied by a properly qualified veterinary surgeon at all reasonable hours enter the dairy and inspect the cows kept therein and if the medical officer or such person has reason to suspect that any cow in the dairy is suffering from tuberculosis of the udder he may require the cow to be milked in his presence and may take samples of the milk and the milk from any particular teat shall if he so requires be kept separate and in all cases a separate and sealed sample thereof shall be furnishsd.

(2) If the medical officer of health is of opinion that tuberculosis is caused or is likely to be caused to persons residing in the city from consumption of the milk supplied from a dairy situate within the city or from any cow kept therein he shall report thereon to the Corporation and his report shall be accompanied by any report furnished to him by the veterinary surgeon and the Corporation may thereupon serve on the dairyman notice to appear before them within such time not less than twenty-four hours as may be specified in the notice to show cause why an order should not be made requiring him not to supply any milk from such dairy within the city until the order has been withdrawn by the Corporation.

(3) If the medical officer of health has reason to believe that milk from any dairy situate outside the city from which milk is being sold or suffered to be sold or used within the city is likely to cause tuberculosis in persons residing within the city the powers conferred by this section may in all respects be exercised in the case of such dairy provided that the medical officer of health or other authorised person shall first have obtained from a justice having jurisdiction in the place where the dairy is situate an order authorising such entry and inspection which order any such justice is hereby empowered to make.

(4) Every dairyman and the persons in his employment shall render such reasonable assistance to the medical officer of health or such authorised person or veterinary surgeon as aforesaid as may be required by such medical officer person or veterinary surgeon for all or any of the purposes of this section and any person refusing such assistance or obstructing such medical officer person or veterinary surgeon in carrying out the purposes of this section shall be liable to a penalty not exceeding five pounds.

(5) If in their opinion the dairyman fails to show cause why such an order may not be made as aforesaid the Corporation may make the said order and shall forthwith serve notice of the facts on the Local Government Board and if the dairy is situate outside the city on the county council of any administrative county in which it is situate and on the council of the borough or district in which it is situate.

(6) The said order shall be forthwith withdrawn on the Corporation or their medical officer of health being satisfied that the milk supply has been changed or that it is not likely to cause tuberculosis to persons residing in the city.

(7) If any person after any such order has been made supplies any milk within the city in contravention of the order or sells it for consumption

therein he shall be liable to a penalty not exceeding five pounds and to a daily penalty not exceeding forty shillings.

(8) A dairyman shall not be liable to an action for breach of contract if the breach be due to an order under this section.

(9) The dairyman may appeal against an order of the Corporation under this section or the refusal of the Corporation to withdraw any such order either to a petty sessional court having jurisdiction within the city or at his option if the dairy is situate outside the city to the Board of Agriculture who shall appoint an officer to hear such appeal. Such officer shall fix a time and place of hearing within the city and give notice thereof to the dairyman and the town clerk not less than forty-eight hours before the hearing. Such officer shall for the purposes of the appeal have all the powers of a petty sessional court.

(10) The Board of Agriculture may at any stage require payment to them by the dairyman of such sum as they deem right to secure the payment of any costs incurred by the Board of Agriculture in the matter of the appeal.

(11) The court or the Board of Agriculture as the case may be may confirm vary or withdraw the order which is the subject of the appeal and may direct to and by whom the costs of the appeal (including any sum paid or payable to the Board of Agriculture as aforesaid) are to be paid but pending the decision of the appeal the order shall remain in force unless previously withdrawn by the Corporation.

136.—Offences under this part of this Act may be prosecuted and penalties may be recovered by the Corporation before a petty sessional court having jurisdiction in the place where the dairy is situate or the offence is committed and not otherwise.

137.—All expenses incurred by the Corporation in carrying into execution the provisions of this part of this Act shall be chargeable on the district fund and general district rate and the Corporation may also charge on the same fund and rate any expenses incurred by them in the application by a veterinary surgeon of the tuberculin or other reasonable test for the purpose of discovering tuberculosis to any cow whose milk is or was recently being supplied within the city. Provided that no such test shall be applied except with the previous consent of the owner of such cow.

138.—The Corporation shall cause to be given public notice of the effect of the provisions of this part of this Act by advertisement in local newspapers and by handbills and otherwise in such manner as they think sufficient and this part of this Act shall come into operationat such time not being less than one month after the first publication of such an advertisement as aforesaid as the Corporation may fix.

139.—This part of this Act may be carried into execution by a committee of the council formed in accordance with and subject to the provisions of the Fourth Schedule to the Diseases of Animals Act 1894 except that the committee shall consist wholly of members of the Council.

AND NOTICE IS HEREBY FURTHER GIVEN that the foregoing provisions will come into operation on the 1st July 1901.

By order,
H. SAYER,
Town Clerk.

Town Clerk's Office,
Sheffield, 24th May, 1901.

Since the above clauses have been in force considerable experience has been gained from the working of them. The results in Manchester and Sheffield will be found in Table XI.

TABLE XI.

Summary of Results obtained in Manchester and Sheffield under the Tuberculous Milk Clauses.

No. of samples of milk bacteriologically examined for tubercular infectn.	1900.	1901.		1902.		1903.		1904.		1905.		1906.		1907.	Totals	
	M.	S.	M.	S.	M.	S.	M.	S.	M.	S.	M.	S.	M.	S.	S.	M.
Mixed samples	295	—	272	28	345	66	329	89	318	68	565	115	542	175	541	2666
Tuberculous	36	—	27	5	36	11	45	6	29	10	47	11	42	17	60	262
Percentage	12·2	—	9·9	17·8	10·4	16·7	12·6	6·7	9·1	14·7	8·31	9·6	7·7	9·7	11·1	9·8
Control samples	—	—	—	1	—	7	—	11	—	17	—	8	—	39	83	
Tuberculous	—	—	—	—	—	—	—	3	—	6	—	1	—	8	18	
Percentage	—	—	—	—	—	—	—	27·3	—	35·3	—	12·5	—	20·5	21·7	
Samples from cows with suspicious udders	—	7	—	20	—	31	—	27	—	29	—	17	—	188	319	
Tuberculous	38	3	16	9	31	9	29	9	19	13	34	11	31	43	97	198
Percentage	—	42·8	—	45	—	29	—	33·3	—	44·8	—	64·7	—	23·4	31·0	
Estimated No. cows on country farms where mixed milk samples were free from tubercular infection	6348	—	5366	345	6210	2967	6251	2350	6042	1339	10,838	1820	12,918	4108	12,929	53,973
No. country cows clinically examined for tuberculosis of the udder, in following up tuberculous mixed samples	1713	—	1441	75	3656	622	2537	170	2651	231	3241	279	2855	783	2160	18,094
Tuberculous	31	—	15	2	31	6	29	1	18	9	33	10	31	15	43	188
Percentage	1·8	—	1.0	2·7	·84	·96	1·1	·59	·68	3·9	1·0	3·6	1·0	1·9	2·0	1·04
No. of City cows clinically examined for tuberculous udder	1579	1067	1839	2264	5649	672	9549	1774	8153	1521	10,527	1434	10,998	8808	12,382	12,418
Tuberculous	7	5	1	7	—	3	—	8	1	4	1	2	—	29	58	10
Percentage	·44	·47	·05	·31	—	·45	—	·45	·01	·26	·009	·14	—	·8	·47	·08
Disposal of cows with tuberculous udders.																
Killed	20	5	9	9	16	7	23	7	15	12	26	11	22	39	90	131
Passed	7	2	2	5	5	4	6	6	7	9	13	6	13	26	58	53
Percentage	35·0	40	22·2	55·5	31·2	57·1	26·0	85·7	46·6	75	50·0	54·5	59·0	66·6	64·4	40·5
Condemned	13	3	7	4	11	3	17	1	8	3	13	5	9	13	32	78
Percentage	65·0	60	77·8	44·5	68·8	42·9	74·0	14·3	53·4	25	50·0	45·5	41·0	33·3	35.5	59.5
Sold or otherwise lost sight of	18	—	7	—	15	2	6	2	4	1	8	1	9	5	11	67

One of the chief drawbacks being that no power is given to slaughter a cow with a tuberculous udder after considerable trouble and expense has been incurred in finding her. It is probable however that the tuberculous milk clauses would have been put in force over larger areas, if not increased in power, before now had it not been for the statement of Koch at the British Congress on Tuberculosis in 1901, when delivering his historic address before the second General Meeting of the Congress. After relating the results of some of his inoculation and feeding experiments with human tuberculous sputum upon young cattle and pigs he startled the world by stating that he felt "justified in maintaining that human tuberculosis differs from bovine and cannot be transmitted to cattle." Speaking of the susceptibility of man to bovine tuberculosis he stated "I should estimate the extent of infection by the milk and flesh of tubercular cattle, and the butter made of their milk, as hardly greater than that of hereditary transmission, and I therefore do not deem it advisable to take any measures against it." Such statements from such an eminent authority were bound to carry great weight and demanded confirmation or disproval without delay. Acting upon Koch's own suggestion that further experiments should be carried out the Congress at the final general meeting passed the following resolution, "That in view of the doubts thrown upon the identity of human and bovine tuberculosis it is expedient that the Government be approached and requested to institute an immediate inquiry into this question, which is of vital importance to the public health and of great consequence to the agricultural industry."

On August 31st, 1901, another Royal Commission was appointed to inquire and report with respect to tuberculosis :—

1. Whether the disease in animals and man is one and the same;

2. Whether animals and man can be reciprocally infected with it;

3. Under what conditions, if at all, the transmission of the disease from animals to man takes place, and what are the circumstances favourable or unfavourable to such transmission.

In 1904 the first interim report of the Commissioners was issued. It contained the following statement :—

"We have very carefully compared the disease thus set up in the bovine animal by material of human origin with that set up in the bovine animal by material of bovine origin, and so far we have found the one, both in its broad general features and its finer histological details, to be identical with the other. We have so far failed to discover any charactei by which we could distinguish the one from the other; and our records contain accounts of the post-mortem examinations of bovine animals infected with tuberculous material of human origin which might be used as typical discriptions of ordinary bovine tuberculosis."

The second interim report of the present Royal Commission was issued in 1907. Its conclusions in regard to tubercle bacilli have already been given. After dealing very fully with the different experiments carried out the Commissioners make, among many others, the following statements in answer to the terms of the inquiry. "Taking all these several facts into consideration, we feel justified in asserting that, regard being had to the differences which present themselves according to the extent of disease produced, and the phase in which the disease exists at the time of examination, the tuberculosis set up by the bacillus of human source is, so far as its anatomical and histological features are concerned, one and the same as the tuberculosis set up by the bacillus of bovine source . . . With regard to the first part of our enquiry, then, that relating to the effects of the bacillus of bovine and human tuberculosis, we find that these are one and the same, save that those of group 2 of human tuberculosis are markedly less in degree. . . . We are thus able to give a positive answer to the second term of our reference. The human body can be infected by bovine tuberculosis. Moreover the results which we have recorded in preceding paragraphs show that the bovine body can be infected by tuberculosis of human source, in some cases to a complete, in others to a limited extent ; bovine animals and man can be reciprocally infected."

The main conclusions of the commissioners are as follows :—

" There can be no doubt that in a certain number of cases the tuberculosis occurring in the human subject, especially in children, is the direct result of the introduction into the human body of the bacillus of bovine tuberculosis, and there also can be no doubt that in the majority at least of these cases the bacillus is introduced through cow's milk. Cows' milk containing bovine tubercle bacilli is clearly a cause of tuberculosis, and of fatal tuberculosis, in man.

* * * *

The facts indicate that a very large proportion of tuberculosis contracted by ingestion is due to tubercle bacilli of bovine source. A very considerable amount of disease and loss of life, especially among the young, must be attributed to the consumption of cows' milk containing tubercle bacilli. The presence of tubercle bacilli in cows' milk can be detected, though with some difficulty, if the proper means be adopted, and such milk ought never to be used as food. There is far less difficulty in recognising clinically that a cow is distinctly suffering from tuberculosis, in which case she may be yielding tuberculous milk. The milk coming from such a cow ought not to form part of human food, and indeed ought not to be used as food at all.

Our results clearly point to the necessity of measures more stringent than those at present enforced being taken to prevent the sale or the consumption of such milk."

The experiments of the Commissioners distinctly prove that Koch was wrong in his deductions and assertions. Moreover, the conclusions of the Commissioners have been confirmed by other experimenters in this country and practically all over the world. To mention the names of only a few there are Delepine, Hamilton and Young in this country, and Thomassen, Ravenel, Nocard, DeJong, Arloing, Kossel, Orth, Vallée, etc., abroad.

PROPHYLAXIS.

Tuberculosis thus being a prevalent disease in human beings and animals, with infection passing from one to the other and vice versa, it follows that measures calculated to stop the spread of infection should be considered by students of both human and animal preventive medicine. Measures dealing with the disease in animals are naturally of interest to veterinary surgeons and that interest is greatly increased because of the many opportunities of infection passing from animals to man due to ingestion by the latter of tuberculous meat and milk. From purely veterinary and agricultural points of view the suppression of tuberculosis is also of importance, because although the loss individually may be small there is little doubt but that taken collectively tuberculosis in animals causes considerable losses to agriculturists generally and also to dairymen and butchers. Before considering any additional preventive measures which may be required or the direction in which they should proceed it is necessary to mention the means there are now at hand for dealing with tuberculosis in animals and the prevention of infection passing from animals to man. The opposite possibility of infection passing from man to animals must not be overlooked but it may be pointed out that any precautions taken to reduce the disease in human beings will of themselves tend to reduce that possibility. As a fact it may be stated that at present practically nothing is being done in this country towards reducing tuberculosis in animals and very little towards preventing infection passing through the channels of meat and milk from animals to man. Further, what little is done in the latter case has no direct bearing upon the former. The preventive action that is now being taken may be conveniently considered under the two heads of meat inspection and dairy inspection

MEAT INSPECTION.

As previously stated the Local Government Board in 1899 advised local authorities to appoint better qualified inspectors of meat and suggested that the conditions recommended by the Royal Commission on Tuberculosis in 1898 should be the rule for passing or condemning the carcases of tuberculous cattle and pigs. As a result of that advice there has undoubtedly been a great improvement in the qualifications of meat inspectors. Since December 1899 the Royal Sanitary Institute has held at least 40 examinations for a Food Inspector's Certificate ; 587 candidates have entered and 390 certificates have been granted. In addition certificates for meat inspectors are also granted by both Manchester and Liverpool Universities. The following are the principles which the Commissioners considered should be observed in the inspection of tuberculous carcases of cattle :—

"*The entire carcase and all the organs may be seized*:—

(*a*) When there is miliary tuberculosis of both lungs.
(*b*) When tuberculous lesions are present on the pleura and peritoneum.
(*c*) When tuberculous lesions are present in the muscular system, or in the lymphatic glands embedded in or between the muscles.
(*d*) When tuberculous lesions exist in any part of an emaciated carcase.

The carcase, if otherwise healthy, shall not be condemned, but every part of it containing tuberculous lesions shall be seized:—

(*a*) When the lesions are confined to the lungs and the thoracic lymphatic glands.
(*b*) When the lesions are confined to the liver.
(*c*) When the lesions are confined to the pharyngeal lymphatic glands.
(*d*) When the lesions are confined to any combination of the foregoing, but are collectively small in extent.

In view of the greater tendency to generalisation of tuberculosis in the pig, we consider that the presence of tubercular deposit in any degree should involve seizure of the whole carcase and of the organs.

In respect of foreign dead meat, seizure shall ensue in every case where the pleura have been 'stripped.'"

Some of the local authorities carry out inspection of tuberculous carcases on these lines, but the practice of meat inspection in this country is anything but uniform or thorough. Meat that is passed in one town would be condemned in another. In some towns no doubt meat inspection is too severe, in others it is probably too lax. Should a Veterinary Service of Public Health ever be instituted in this country, meat inspection is one of the matters which such a service could usefully be called upon to perform. On the Continent veterinary inspection of meat is an undoubted success. In regard to the inspection of the tuberculous carcases of pigs on the lines recommended by the Commissioners, much dissatisfaction has arisen, and many, including the writer, still requires convincing "that the presence of tubercular deposit in any degree should involve seizure of the whole carcase, and of the organs" (of pigs). In several large towns, notably Glasgow and Belfast, this principle is not acted upon. In the latter town the Authority after inquiry gave notice to their Inspectors to that effect.

DAIRY INSPECTION.

If meat inspection is not uniform and thorough, it can only be stated that dairy inspection is far worse. The Dairy etc. orders and tuberculous milk clauses have already been alluded to. The former are only adoptive and local in action, and in many places after adoption no inspection is carried out to see that the Regulations made under the Orders are complied with, generally speaking in strictly rural areas they are a dead letter. Even where the Orders and Regulations are enforced the procedure is again far from uniform. It would appear therefore, that in dairy inspection there is another opening in which a veterinary service of public health could do useful work.

The work of inspecting dairy and other cattle, and the sanitary conditions of cowsheds and farm premises generally, would be congenial to veterinarians; further it is certain that no class of men can possibly be as well qualified for the duties.

As already pointed out only a few large towns possess the powers given by the tuberculous milk clauses; where they are enforced no doubt some good is done towards decreasing the amount of tuberculous infection in milk. The experience in Birmingham is summed up as follows (48) :—

(*a*) The Model Milk Clauses have been most valuable in demonstrating that at least 10 per cent of the milk sent into the city contains the living germs of tuberculosis.

(*b*) The clauses are cumberous and somewhat ineffective as far as finding and eliminating the cows which yield tuberculous milk are concerned.

(*c*) The part of the Model Milk Clauses relating to the notification by farmers of cows suspected of having tubercular udders is practically inoperative.

The following table shows roughly the result of working the tuberculous milk clauses in Manchester and Sheffield for seven years. Manchester 1900-06, and Sheffield 1901-07.

The result of experience in the working of the model milk clauses in Liverpool, Manchester, Birmingham, Leeds and Sheffield, justifies the statement that at least 10 per cent. of the milk put on the market in those cities contains the infection of tuberculosis.

During the seven years ended December 31st, 1906, mixed samples of milk sent from 2,666 farms to Manchester were examined for tubercular infection, with the result that 262 = 9.8 per cent. were found to be tuberculous. Dnring the six years ending December 31st, 1907, mixed samples of milk sent from 541 farms to Sheffield were examined for tubercular infection, of which 60 = 11.1 per cent. were found to be tuberculous. The corresponding percentages for Liverpool and Birmingham were 14.5 and 14.0 respectively. The estimated number of cows on the 2,666 farms mentioned above, is given as 53,973 in the Manchester Annual Reports, a number which works out at just over 20 cows per farm. On the same basis the number of cows on the 541 farms sending milk to Sheffield amounts to 10,870. The number of cows found to have tuberculous udders in each instance were respectively 188 = to a percentage of 0.35 (nearly) and 43 = to a percentage of 0.4 (nearly).

In Manchester City cowsheds there are about 1,200 cows, and giving every cow an average milking life of 8 months in the city cowsheds, it follows that there are about 1,800 in the Manchester cowsheds every year, or 12,600 for 7 years. During this time, although the inspection was carried out several times a year, only 10 cows were discovered with tuberculous udders = to a percentage of 0.08 (nearly). In the Sheffield City cowsheds there are housed about 2,400 cows which at a milking life of 8 months gives 3,600 a year. For the 6 years ended December 31st, 1906, the udders of only 8,732 cows were examined, the number found to be tuberculous was 29 = to a percentage of 0.33. In 1907 the number of inspections of cows' udders was 8,808, which on the basis of 3,600 cows being in Sheffield City cowsheds tends to show that each cow was inspected at least twice during the year. The number of cows having tuberculous udders was 29, equal to a percentage (on 3,600) of 0.8, thus giving a total of 56 city cows with tuberculous udders found in 7 years.

The result of working the model milk clauses in Manchester for 7 years was to detect 262 tuberculous mixed milks coming into Manchester City for human consumption, and to discover 188 country cows with tuberculous udders. It will thus be seen that at nearly one-third of the farms sending tuberculous milk to Manchester City, a cow with a tuberculous udder was not found.

By adding the 10 tuberculous cows found in Manchester City cowsheds to the 188 above mentioned there is a total of 198 cows found with tuberculous udders. Of these 131 were killed and the carcases of 53 (40.5 per cent.) were passed totally or partially as human food, whilst 78 (59.5 per cent.) were condemned and destroyed or buried. Sixty-seven, however, were sold by their owners or otherwise lost sight of, possibly to again become milking cows and produce further tuberculous milk for human consumption in Manchester or elsewhere.

The result of working the model milk clauses in Sheffield for the seven years (ending December 31st, 1907), was to detect 60 tuberculous mixed milks coming into Sheffield for human consumption, and to discover 43 country cows with tuberculous udders (two cows were found at each of three country farms). At 20 farms sending tuberculous milk to Sheffield no cow with a tuberculous udder could be found.

By adding the 58 tuberculous cows found in Sheffield City cowsheds to the 43 mentioned above, there is a total of 101 cows found with tuberculous udders. Of these, 90 were killed, 58 (64.4 per cent.), were passed totally or partially as human food whilst 32 (35.5 per cent) were condemned and destroyed or buried. Only 11 were sold by their owners or otherwise lost sight of, possibly to produce tuberculous milk elsewhere.

As mentioned in the Birmingham Statement the model milk clauses have been valuable in demonstrating the fact that at least 10 per cent. of the milk upon the market contains the infection of tuberculosis, but it is also true that the clauses are cumbrous in their working and ineffective in various ways. 1. The Notification Clause is practically a dead letter. 2. The Isolation Clause fails in that it does not compel isolation and detention on the premises where the cow with a tuberculous udder is found. 3. No power is given to have the tuberculous cow compulsorily slaughtered when found. 4. Nothing is being done at present under the Model Clauses (or in any other way) towards decreasing the amount of tubercular disease present amongst the cattle of this country, reducing the considerable losses now borne by farmers and butchers, or removing the serious menace to human health which we now know exists through the consumption of tuberculous meat and milk.

There is, of course, one method by which the public can protect themselves against tuberculous infection in milk, *i.e.*, to destroy the tuberculous germs by heat or some other method such as aeration or the Buddé process. Anything done on such lines, however, means trouble and expense. Further, many prefer to drink milk in the raw state, and when milk is purchased, the purchaser has a right to be supplied with milk minus tubercular or any other infection.

Nobody will assert that at the present time the public are obtaining such milk, or that any radical steps are being taken towards that end in a uniform and general manner. It is true that the President of the Local Government Board has promised a Bill to deal with milk, but if it is to be of value in dealing with tubercular infection it must necessarily deal with tuberculosis in animals. Not only must the interests of consumers of milk be taken into consideration but also those of consumers of meat, purveyors of meat, cowkeepers and purveyors of milk, and breeders of cattle. In a word, to be of any avail any legislative measures introduced should, at least, be a commencement of action towards the suppression of tuberculosis in farm food animals. What that action should be is a matter for very serious consideration on the part of all concerned.

On the Continent we have Von Behring, and others, experimenting with immunisation by means of serum and vaccines. In Denmark, Bang has met with considerable success by tuberculin testing and segregation of reacting animals coupled with sanitary and other precautionary measures. In this country we have as a guide for action the recommendations of the Royal Commission on Tuberculosis, contained in the Report of 1898. These may well be the basis of preliminary measures although nothing short of complete eradication will satisfy some authorities.

On the 28th of February in this year a conference of representatives from Birmingham, Leeds, Liverpool, Manchester and Sheffield was held at Manchester to discuss the problem of Tuberculosis and the Milk Supply and "to decide what steps, if any, shall be taken to limit the amount of milk containing the living infection of tuberculosis which is sent into towns in this country." Since then Dr. Niven, Medical Officer of health for Manchester, has read a very able paper on the subject before the members of the Lancashire Veterinary Medical Society, when the following resolution was passed:—

"That having regard to the serious danger of the transmission of bovine tuberculosis to human beings, and also to the great financial losses suffered by the agriculturist, we urge upon His Majesty's Government the necessity for compulsory and uniform legislation having for its object the complete eradication of tuberculosis from bovines within a reasonable period of years." It was also resolved to forward copies to the Board of Agriculture, the Local Government Board and the Royal College of Veterinary Surgeons. Whatever legislative measures may be taken in the future against tuberculosis in cattle it is evident that as a beginning only somewhat elementary action will be possible. The number of tuberculous cattle in this country, the different interests of landlords and tenants, butchers, dairymen and farmers involved, the cost of the undertaking, not to mention the decline in meat and milk supply and the consequent increase in cost of such commodities, have all to be considered and it is then at once evident that any measures for stamping out tuberculosis upon such lines as expunged Cattle Plague, Pleuro-pneumonia and Foot-and-mouth-disease from this country are out of the question. Action upon the lines recommended by the Commissioners can be undertaken at moderate cost and owing to the inaction caused by Koch's statement it is apparent that the problem must again be taken up from where it was left in 1898. The most pressing question is no doubt the one dealing with tubercular infection in milk sold for human consumption and especially in large towns.

The remedy in theory is simple—get rid of tuberculous milking cows—but in practice this will be a difficult task to perform. Stamping out is at present an impossible task owing to the enormous expense it would entail. The process has been attempted in Massachusetts and Belgium but in both countries has failed because of the cost. Further, this country is not prepared for any such drastic measures and probably there is no urgent reason for such a course. Bovine tuberculosis is a chronic disease and can be best fought, not by rushing to extremes, but by gradual and persistent efforts to combat the affection on all sides. For the purposes of discussion the writer suggests the following line of action.

A. Legal measures to deal with clinically tuberculous cattle—that is cattle affected with visible or "open" tubercular disease.

1. The Board of Agriculture should schedule "open" tuberculosis in cattle.

2. There should be presumption of knowledge of open tubercular disease on the part of cattle owners.

3. There should be compulsory notification by owners of such cattle with prosecution for failing to do so.

4. There should be compulsory notification by veterinary surgeons attending such cattle with a small fee for notification.

5. Notification should be followed by investigation by whole-time veterinary officers of health, empowered to employ any or all of the following methods, (*a*) use of tuberculin, (*b*) harpooning the udder for diseased tissue, (*c*) microscopic examination of diseased tissue or discharges, (*d*) bacteriological examination of milk.

6. There should be compulsory slaughter of cattle visibly affected with "open" tuberculosis, with compensation (carcase value) for animals notified—without compensation if un-notified. Full value for animals slaughtered and found not to be affected.

7. Prosecution to follow failure to notify visibly diseased cattle and cows affected with or suspected of tuberculosis of the udder, for being in possession of such cattle or their carcases, for attempting to sell such cattle or their carcases or their milk for human food, and for keeping such cattle in contact with other cattle.

B. Voluntary measures on the lines followed in Denmark by Bang. Free tuberculin testing by whole-time veterinary officers of health to be offered to owners of cattle on the following conditions. (1) That "reactors" be branded and isolated, (2) that infected buildings be disinfected before further use, (3) that "reactors" if bred from have their calves removed at birth, to be brought up in tubercle-free buildings, and fed on boiled milk, (4) that "reactors" shall only be sold for immediate slaughter in licensed slaughter-houses in the presence of the veterinary officer of health, (5) full compensation to be paid for carcases or parts of carcases condemned as unfit for human food.

C. A national system of compulsory sanitation and disinfection of cowsheds and farm premises. (1) That owners of insanitary cowsheds be compelled to put them in good sanitary order, (2) that occupiers of cowsheds be compelled to keep their premises clean and free from tubercular infection.

D. The institution of a national veterinary service of public (animal) health to carry out the measures just indicated, also to educate the public and advise agriculturists to take action.

E. A Government grant to find the money necessary for compensation, and the systematic working of the measures.

The amount of money required under D and E can be fairly estimated on the following basis.

According to the Agricultural Returns for Great Britain for the year 1907 the total number of cows and heifers in milk is 2,7593,18, the proportion of which affected with tuberculosis of the udder at 0.6 per cent is 16,556, and with systemic tuberculosis at 30 per cent is 827,795. The average life of milking cows is probably about seven years, and thus 1-7th of 827,795 or 118,256 milking cows are killed annually. In Saxony according to the 1898 Report of the Royal Commission on tuberculosis, only 2 per cent of tuberculous carcases are totally condemned; there would thus be 2365 cows to be paid for annually, which at £10 per cow comes to £23,650 per annum to be paid for the destruction of 1-7th of the tuberculous milking cows of Great Britain, a sum which the country can easily pay, and which would be well spent.

Unfortunately executive work as carried on under the Board of Agriculture costs three times as much for administration as it does for compensation. Thus for the year 1906-7 swine fever cost the country £13,455 for compensation, and £39,875 for adminstration, whilst for 9 months ending December 31st last the sums are £14,658 and £40,834 respectively. Administration therefore in regard to executive action against tuberculosis would probably cost (£23,650 × 3) £70,950 which plus £23,650 for compensation gives the total sum required as £94,600 (or in round figures £100,000) a year. If the country can pay over £50,000 a year to deal with swine fever—a disease not communicable to man, but which notwithstanding this expenditure has been allowed to treble itself during the last two years—surely the country can pay twice that amount in order to start some radical measures to free itself from bovine tuberculosis, the cause of serious losses to owners of cattle, and a disease now proved to be communicable from animals to man.

REFERENCES.

1. Journal of Comparative Pathology, vol. 17, p. 161
2. ,, ,, ,, vol. 20, p. 52
3. ,, ,, ,, vol. 19, p. 355
4. ,, ,, ,, vol. 11, p. 233
5. Les Tuberculoses Animales, Paris, 1895.
6. Proceedings of British Congress on Tuberculosis, vol. 2, p. 95
7. Journal of Comparative Pathology, vol. 16, p. 357.
8. ,, ,, ,, vol. 21, p. 13.
9. Proceedings of British Congress on Tuberculosis, vol. 4, p. 12.
10. Journal of Comparative Pathology, vol. 2, pp. 229 to 232.
11. Proceedings of British Congress on Tuberculosis, vol, 3, p. 585
12. British Medical Journal, vol. 2, 1901, pp. 774—7.
13. The Etiology of Tuberculosis: Experiments 26.
14. The Veterinary Record, vol. 15, p. 233.
15. Journal of Comparative Pathology, vol. 18, p. 263.
16. ,, ,, ,, vol. 19, pp. 229—245.
17. Report of Royal Commission on Tuberculosis, 1895, part 1, p. 9
18. ,, ,, ,, ,, ,, p. 10
19. The Veterinary Record, vol. 16, p. 216.
20. Journal of Comparative Pathology, vol. 12, p. 156.
21. ,, ,, ,, vol. 12, p. 199.
22. Handbook of Meat Inspection: Ostertag—Wilcox: p. 621.
23. Journal of Comparative Pathology, vol. 11. p. 239.
24. ,, ,, ,, vol. 12, p. 162.
25. ,, ,, ,, vol. 11, p. 228.
26. The Veterinary Record, vol. 20, p. 656.
27. Journal of Comparative Pathology, vol. 17, p. 266.
28. Meat Trades' Journal, vol. 16, p. 83
29. The Veterinary Journal, vol. 13, p. 114.

30. Journal of Comparative Pathology, vol. 11, p. 238.
31. ,, ,, ,, vol. 17, p. 31.
32. Handbook of Meat Inspection: Ostertag—Wilcox: p. 607
33. Journal of Comparative Pathology, vol. 12, p. 57.
34. ,, ,, ,, vol. 13, p. 69.
35. The Veterinary Record, vol. 20, p. 591.
36. Proceedings British Congress on Tuberculosis, 1901, vol. 4, p. 48
37. Journal of Comparative Pathology, vol. 12, p. 190
38. Handbook of Meat Inspection: Ostertag—Wilcox: pp. 604-5
39. The Veterinary Journal, vol 64, p. 16
40. Proceedings British Congress on Tuberculosis 1901, vol. 4, p. 19
41. Journal of Comparative Pathology, vol. 12, p. 164
42. Proceedings of British Congress on Tuberculosis 1901, vol. 4, p. 33
43. ,, ,, ,, ,, ,, vol. 3, p. 153
44. Journal of Comparative Pathology, vol. 13, p. 380
45. ,, ,, ,, vol. 17, p. 258
46. ,, ,, ,, vol. 21, p. 154
47. Report of Royal Commission on Tuberculosis 1895, part 1, p. 24
48. Statement in Regard to Tuberculosis and the Milk Supply, issued by the Birmingham Corporation, January, 1908.

DISCUSSION.

The PRESIDENT: Before the discussion commences, Mr. Lloyd wishes to make a personal remark.

Mr. J. S. LLOYD: There are two little matters which I omitted to mention in the paper which are very much before agriculturists and the purveyors of meat at the present day. They relate to the loss of carcases more particularly confiscated under the Public Health Act. I was reading the other day *The Farmer and Stockbreeder*, which went for the butcher very strongly because he wanted a warranty with all fat cattle, and at the same time suggested that the farmer or the feeder of the cattle should bear part of the loss with the butcher who killed the animal and afterwards had it condemned, Probably that matter will play a very prominent part in regard to any measures taken for the eradication of tuberculosis, and the protection of human beings from infection by eating tuberculous meat or drinking milk. There is no doubt that the questions of warranty and insurance are likely to be rather thorny, and I have brought them before the meeting so that any gentlemen who wish to speak on them will be in order in doing so.

Mr. S. STOCKMAN: Mr. President and Gentlemen,—I did not intend to be asked to open the discussion; but I think you will all agree with me that this is a paper well worthy of discussion. I have, in the first place, to thank Mr. Lloyd for bringing the subject before us, but at the same time I should like to express a little sympathy with him, in this way:—that the reading of a paper on tuberculosis and what we can do to eradicate it always puts one in mind of the man who has to say something about Robert Burns or who proposes the toast of "The Ladies" at a dinner: there is very little new he can say upon such very interesting subjects. At the same time it does not follow, that because we know most of what is required to be known in connection with tuberculosis in order to proceed to action, we should not discuss it fully, and the fact remains that although we do know a great deal, and although our essayist has told us enough to go on with for the present, very little has been done. As professional men, there are two rules we have to obey. We have to investigate, and then when we have arrived at a solution by investigation we have to preach it. I should like to say, first of all, with regard to the Model Milk Clauses, that that is a form of legislation which personally I have very little sympathy with. It is a kind of legislation which is peculiarly British. It combines in my opinion a great deal of irritation with very little effect. I think one of the weak points of the Model Milk Clauses is that the provisions tend to drive the wasters and the udder cases into the country, whereas it used to be the case that the towns were the dumping ground for doubtful animals. Under this kind of legislation, the country will become the dumping ground. One cannot blame the towns. They are quite right to look after themselves, but this is a kind of legislation that one would not describe as statesmanlike. It is merely shifting the position of the incidence of infection. That is one of the weak points of local government; it tends to become very narrow or selfish; indeed the local authorities cannot help themselves, because they have very little jurisdiction outside their own small district. But there is another point with regard to local authority administration, and that is that it is carried out largely by medical officers of health- I say largely, but not always—and by Town Committees who, not from any intention but from ignorance, are not as much in sympathy with the position of the agriculturist as one would like them to be. I think most of you will agree with me that the veterinary surgeon, apart altogether from his superior and more pertinent knowledge of animal diseases, is by his training much more in sympathy with the position of the agriculturist, and more likely to pay attention to important points that really have a vital bearing on his business. In dealing with a disease like this we never have a clean slate; we are always face to face with a position created by precedent and vested interests. As far as the medical officer and the Town Committee, or, if you like, the Lay Administration Branch of a Government Department is concerned, seeing what we know at present with regard to tuberculosis, the medical officer has only to read what we know and get it up thoroughly and he could then, even if he was not a medical man or a veterinary surgeon, with the knowledge before him, put on paper a scheme for the eradication of tuberculosis which theoretically might appear sound. The trouble comes in when you come to apply such schemes, because you always find that little things connected with the training and movement of animals have been forgotten. The two things that we want to pay most attention to in legislation of this kind are sound science and sound government. If you push the scientific side too far you come into conflict with good government, and if you simply try to meet the people's wishes you come into conflict with science, so that you have to make a compromise. That is where the mental application comes in—not so much in putting forward a theory based on the scientific knowledge of tuberculosis, but in making a compromise between good government and good science. Another point I would like to refer to, which I come across officially, is this. There are certain officers in certain places who seem to think they have a mission to get rid of tuberculosis. They consider nobody; they simply consider that their object is to get rid of tuberculosis, and that anyone who stands in their way is wrong. That attitude—I am glad to say it is not a common one—is one that does more harm to the attempts to eradicate tuberculosis or any other disease than almost anything else.

If one reads the utterances of speakers at big agricultural meetings which have discussed this question, one is rather struck with the position which agiculturists have latterly taken up. From what I can gather from what is said, it seems to me they now recognise that something must be done to tackle the tuberculosis question, and that it is no use refusing every remedy. They recognise that something must be done, and what many of them are asking is that the question should be dealt with in a scientific manner. One of the things which must have pleased our profession more than anything else is the number of times agriculturists have insisted that if the animals are to be examined and condemned the examination should be carried out by veterinary surgeons, by men who are properly trained. That I may tell you is the feeling of the Department which I myself have the honour to belong to. There is a difficulty, however, and I do not think Mr. Lloyd referred to it, namely, the most unfortunate splitting up which took place several years ago under the Contagious Diseases (Animals) Act, *i.e.*, where the cowsheds and milk shops were handed over to one Department, and the contagious diseases of animals were dealt with by another. That really raised a position which is almost impossible. I think the proper distribution is that one Department, the Board of Agriculture, should deal with the cowshed question, and that the milk shop question is a subject if you like for the Local Government Board. However, that position exists—it is one of the difficulties that no one, I suppose, foresaw at the time—and which we have to contend with.

There is one special thing in the paper that perhaps I can give a little further information on, and that is on the harpooning method for the diagnosis of tuberculosis of the udder. Some twelve years ago I happened to practise this to some extent, and in the first two or three operations I performed I found the tubercle bacilli very easily. I was carrying on the work with animals who were going to be slaughtered, so that I had a good opportunity of seeing what the state of the udder was afterwards, and I found there was quite a large number in which I failed to get positive results in tuberculous udders, the reason being in one set of cases that you run a great chance of harpooning between the nodules and not removing a piece of the tuberculous tissue at all. The other reason was exactly similar to what we used to find at the Edinburgh slaughterhouse, namely, that one of the commonest tuberculous lesions of the udder was almost complete induration of a quarter, that is to say it had become fibrous tissue, and you hardly got a nodule throughout that fibrous tissue. You may harpoon it, you may even get microscopical sections, and over large areas fail to find any tubercle bacilli. Cases of that kind are not open to that method; but the method, I am sure, as an adjunct to other methods is very useful.

Mr. Lloyd advises the scheduling of what we may call clinical tuberculosis as an important measure in solving the milk question. I thoroughly agree with him, as I dare say he will have gathered from my previous remarks. It is all very well to establish a Department of Sanitary Science in connection with towns, but it is quite impossible to carry that out in a proper way in connection with the country districts, and therefore what would happen would be that the bad animals accumulate in the country districts. But if in addition to the examinations of milk and of udders you schedule tuberculosis and make it a disease which has to be reported, you in some measure at least catch the wasters, or animals that are likely to become clinical cases, which are lurking in the country. I really do not think that any scheme which does not include the scheduling of tuberculosis will be a scheme that will do very much good. But there are difficulties about scheduling tuberculosis. What I understand Mr. Lloyd means is to practically deal with tuberculosis in the same way that we do with glanders, *i.e.*, cases that a man could diagnose without mallein should be reported. It is rather more difficult with tubercle. Are we going to make a man report an animal with a tuberculous enlargement, say, of a gland of the throat? That would be looked on as a clinical case.

I forgot to bring with me an instrument which they use in Holland, where every local authority and veterinary surgeon is provided with a spoon, and he is suppoced to go round the suspected cases, spoon out the mucus from the trachea, and examine it. A large number of cows with tuberculosis of the lung will be excreting tubercle bacilli at times in the sputum, and it seems to me that we would have to a little more narrowly define tuberculosis before we could schedule it as a practical measure. But I do not think the difficulty is insurmountable.

As regards Bang's method, nobody who has studied the subject at all will dispute that great things can be accomplished by Bang's method. The unfortunate thing, however, is that it takes such a long time, and we all of us know what the British farmer is. He has very little use for methods that take several years to accomplish anything by, and although it is a thing that one would advise the individual, it is very difficult to come to a conclusion whether or not it is a good thing to generally advise farmers to do. You can advise them certainly, but I do not think you will get many farmers to carry it out. It is a pity, but still I think that is what we have to face.

Another very important suggestion of Mr. Lloyd's is that there should be instituted a Department of Veterinary Public Health. With that I am thoroughly in agreement—that we should have veterinary officers of health as well as medical officers of health attached to Local Authorities. But one has to ask oneself this question: supposing to-morrow the local authorities said, we are prepared to appoint veterinary medical officers of health who will be able to do all that a medical officer of health does in connection with human diseases, that is to say examine milk samples, make bacteriological examinations and so forth; we have to seriously consider whether we have in this small profession of ours enough men to fill those billets straight away. We have to remember that the ordinary medical course was not considered sufficient for any man who was going to follow public health work, so that a diploma was instituted, and afterwards a Degree which took a year or eighteen months more study. I think this is a very important period in the existence of the profession, and I think it is about time the Royal College of Veterinary Surgeons seriously considered instituting a diploma for training in veterinary public health. It will at least shove the matter on to a considerable extent. The trouble is that we require money. I do not want to bring professional politics into this meeting, but I do not see how we are going to get this money unless we get the guinea that we have heard so much about lately. I should not presume when we have got it to dictate to the profession what to do with it, but if I can persuade the Council to expend some of it in appointing examiners and instituting a diploma in State Medicine or Municipal Medicine for veterinary surgeons, I shall certainly try to do so.

Then there is another point. In the last two or three paragraphs of the paper, in calculating the causes and the number of cases, I think Mr. Lloyd has made one omission. It is a thing that gives one who is connected with running a Contagious Diseases Act a lot of bother, *i.e.*, Mr. Lloyd has not provided for the incidence of the disease. He tells us, as nobody knows better than I do, that swine fever has gone up to a considerable extent, in spite of all the measures we have put in force. But that happens with regard to every disease where the measures that are applied are measures of control and not of stamping out. If we knew the incidence of the disease we would be in a practical position to stamp the disease out. Nobody knows for what reason a wave of disease comes up at certain times and then dies down again. We see just the same with smallpox; we saw it rather more with glanders in the years that have gone by, and we see it in connection with every disease which we are not seriously trying to stamp out. But no one is going to argue that because these unfortunate rises take place the regulations of control which are applied do no good. If tuberculosis is scheduled, as I hope it may be in the near future, I should be quite prepared to meet with these rises; they would not bother me. People may sneer at medical legislation and say, "Look at what has happened; in spite of years of this, the number of cases has gone up again." But that is not the way to look at it. The thing to look at is, what would have happened if there had been no control?

The last point I want to refer to is the cost of administration to which Mr. Lloyd has referred. I think that is a very serious factor in almost every disease we touch, either to control or stamp out. It applies, not only to British Departments but to Departments of all nationalities, and also to local authorities. The Treasury knows very well that, once they start an administration for the control of a disease, that adminstration will grow like a snowball; and one cannot wonder, in looking over what has happened in connection with so many diseases, that the Treasury is disinclined to provide money for schemes which do not promise much finality. We may say these are methods of control, but the Treasury on the other hand look at it in another way and say, "We do not know where it is going to lead us to; in almost every other case it has led us very much further than we expected it would." That has happened in connection with swine fever, for instance. In that connection Mr. Lloyd points out that £40,000 has been spent on administration, and that the disease has gone up. I have a very much worse position than that to face, because I find that, of that £40,000, nearly £25,000 has been spent on veterinary fees. I do not say we have not had good value, but if we are to stop spending the money because apparently for the time being the Orders do not seem to operate, we will soon be in a chaotic condition again. The important point in controlling a disease is to get it under control until you find that science provides you with a method of stamping it out. You have to mark time with nearly every disease, because if you go into the field, as we did with swine fever, and attempt to stamp it out before you know a great deal about it, you end in this disaster—that you do not accomplish the stamping out business. So far as tuberculosis is concerned, we must be careful that we do not fall into the error of promising the public that what we advise them to do will stamp out tuberculosis, or will every year, year in and year out, keep down the number of wasters and cows suffering from udder disease that they have to pay for.

Mr. J. Cameron: It is a long time since we first began the discussion on the subject of tuberculosis in its relation to meat and milk. The first time we began it was I think under the Presidency of the late Dr. Fleming. I do not remember whether it was the first year or not of the Association's existence but it was thereabouts, and we have considered subject many times since. I hope, however, that no one grudges it being brought forward again, especially after what took place in April last year. We all know there are annuals, and I hope this hardy annual of ours will receive its fitting reward comparatively soon. In addition to that, I consider we are only doing our duty to the nation in discussing this subject. There is a duty upon us as a profession, and also to the nation at large, to thoroughly thresh out the question of tuberculosis and arrive at a remedy for its suppression. I consider that not only this Association but the Parliamentary Committee of the profession and the Council should take the matter in hand. Sometimes the Council and the Committees feel they are not competent, or have not sufficient information themselves to continue the work, and occasionally bodies of that sort add to their number from outside sources so that they may be better able to do it. I think we can assist Parliament very much indeed on this subject, and I hail with great pleasure the progress which is now being made. There is one item that I do not think has received as much attention as it should have done in the past. I maintain that the children of the working men in the country require to be protected—not only the men working on the farm who have cows of their own, from the selling of the milk of which they make money, but the children of the poor throughout the whole country, and we all know they are not protected at the present time. Owing to the regulations that have been made for some time back, the cows in cities and towns are much healtheir and much clearer of tuberculosis than those in the country, and the people in the towns are pretty well protected. But where the cow living in the country lives to an old age, and gradually gets into a very bad condition of tuberculosis, the children there have a far greater share of danger than those living in the towns. With regard to the question of clinical tuberculosis and the difficulties connected with the subject, I think it will be solved outside much easier than some people imagine. I heard all that was said at the first meeting at which we discussed the subject some long time ago—I was quite young then—and towards the end of the meeting I made a few remarks which are not reported in the proceedings. I remember saying that all the suggestions made were very nice pious opinions, but there was no power to put them into force. I remember advocating that the public should see the source of their milk supply, and then we should have the power at our backs that would move anything, I have been preaching that doctrine ever since, and it was with very great pleasure that I noticed that that process is carried out in Ireland, and on a comparatively recent occasion Sir John M'Fadyean made some remarks on similar lines. Let the public see the dwellings that the animals occupy that are supplying them with milk, and the conditions under which the milk is produced, and you will then soon have enough power at your back to do anything you choose with them. It is suggested that the adoption of the system would have to be put off because some particular Department of Government is chary of the expense which would be involved. We have not much evidence of that, although those who are behind the scenes may have some evidence of it. A beginning must be made some time, and therefore we cannot urge too freely that something should be done, and that we should give as much assistance as lies in our power.

Prof. J. Macqueen: Mr. President and Gentlemen, I had no intention of saying a word on tuberculosis or on the paper when I came into the room, but as the discussion is somewhat flagging I may perhaps be allowed to direct the attention of the members to a few points. There is no doubt we are all agreed as to the great danger to the human population of the disease tuberculosis. We are agreed that it is a menace to the health of the public, through the medium of milk mainly, and to a less extent through the medium of meat. I do not think it is worth while wasting time discussing that point. The first point to my mind is whether the country at the present time is prepared for legislation regarding its suppression. We have seen some evidence of anxiety on this point, but I am not aware that there has been any strong action taken with regard to promoting it. You may notice towards the conclusion of this paper that a statement is made that a resolution was passed at a meeting in Lancashire calling upon His Majesty's Government to undertake the suppression of the disease. That is all very well, and it may be that today this Association will pass a resolution asking His Majesty's Government to assist in the suppression of tuberculosis. I am very much in doubt, however, whether the cattle owning public, and even the milk consuming public, are sufficiently acquainted with the disease and the immense expenditure that will be necessary for its suppression to sanction any immediate action. But I waive that point, because there may be some very good reason for urging it.

With regard to actual suppression, I would like to direct particular attention to what may be regarded as the conclusions of the essayist which are given on page 90: "The remedy in theory is simple—get rid of tuberculous milking cows— but in practice this will be a difficult task to perform." Well, I think everybody will agree with Mr. Lloyd in that; I certainly most heartily agree with him. I believe that, while it appears a very simple matter, it is very difficult to carry out. But there is this point that I should like to bring before your attention. Should this movement for the suppression of tuberculosis emanate from the governing body, either Imperial or local, or should it proceed from the owner himself? We know that a great many owners of pedigree stock, which no doubt is more or less affected with tuberculosis, are well acquainted with the state of health of their herds, and if there is any way of inducing these men to improve their health we ought to start first of all by what may be called private action. I think the owners should make an effort before the question is taken up as a public question. With regard to Mr. Lloyd's suggestion that open tuberculosis should be scheduled, I see no particular objection to scheduling open tuberculosis, but I am not quite clear as to how this open tuberculosis is to be satisfactorily diagnosed. One may suspect tuberculosis, but it appears to me that before legislation can operate one ought to be satisfied with something more than a suspicion of the existence of a disease. Take tuberculosis of the udder: I notice Mr. Lloyd refers to the tuberculin test, to harpooning the gland and perhaps examining the milk, but even with all these tests I am afraid we should not be able to say quite definitely in every case that we were dealing with a case of tuberculosis. There are cases of udder disease which are sometimes due to systemic causes, which are sometimes due to a passing change in the constitution of the animal, and although the local symptoms may appeal to one as suggestive of tuberculous udder the suspicion may be quite unfounded. Mr. Lloyd may tell us that we should fall back upon the tuberculin test. I am afraid we shall never have the tuberculin test agreed to by owners of dairy cows until there is ample compensation; and when there is ample compensation we may reach the condition which distinguishes swine fever, *i.e.*, as Mr. Stockman has told us today there is no end of it, in fact apparently the disease increases as the compensation becomes more liberal.

There are two or three points in Mr. Lloyd's statements to which I should like to draw attention. Take the first one—"The Board of Agriculture should schedule 'open' tuberculosis in cattle." I have no objection to that; schedule it if they can.

2. "There should be presumption of knowlege of open tubercular disease on the part of cattle owners." To that I should say, why? Why should a cattle owner, without inducement, assume the existence of tuberculosis? You must hold out an inducement nowadays. At the beginning of my remarks I was inclined to appeal to the moral spirit in the owner, but the moral spirit of men in connection with animals is never high, and especially when it touches the financial region it seems to sink precipitately.

3. "There should be compulsory notification by owners of such cattle with prosecution for failing to do so" Why should there be compulsory notification by owners? An owner is not supposed to know anything about disease—at least veterinary surgeons tell the owner so. They tell the owner quite politely that he is concerned in providing the stock for the veterinary surgeon to treat, and why should we throw the responsibility or the onus of declaring the existence of disease on the owner? It might be done through the veterinary surgeon if considered desirable.

4. "There should be compulsory notification by veterinary surgeons attending such cattle with a small fee for notification." The "small fee for notification" might have been in italics. I believe in compulsory notification provided there is compensation, but I do not believe in interfering with any man's goods if there is no compensation for declaring the existence of disease or other fault.

5. "Notification should be followed by investigation by wholtime veterinary officers of health." Mr. Lloyd desires to create a monopoly; he wishes to see growing up amongst us a series of men of light and leading who have become so because of a post graduate course of instruction. These are the men who are to be whole-time officers, who are to do all these important services to the British public. I do not agree with him, I believe that the legitimate veterinary surgeon—and by the legitimate veterinary surgeon I mean the veterinary surgeon who is engaged in earning his daily bread by attending to horses, cattle, pigs, poultry and all their diseases—I believe that those are the men who ought to have the power of notifying the existence of disease of any sort. There is no necessity for calling in an expert for the purpose of notifying the existence of tuberculosis. The first thing to do—I say this at the risk of repeating myself—is to offer the owner compensation. Having offered compensation, leave the veterinary surgeon to do the notification. It is unnecessary to provide whole-time veterinary surgeons.

6. "There should be compulsory slaughter of cattle visibly affected with 'open' tuberculosis." I think that is unobjectionable, if compensation is to be forthcoming. The owner would at once agree to sacrifice the animal if he was likely to get more for it than a knacker's price, especially nowadays when there is so much trouble with regard to the butcher buying a doubtful animal.

7. "Prosecution to follow"—If I did not know Mr. Lloyd I should think he belonged to the Council of the Royal College of Veterinary Surgeons; he seems to be strong on carrying out the law to the bitter end. "Prosecution to follow failure to notify visibly diseased cattle and cows affected with or suspected of tuberculosis." That is a paragraph that might very well have been left out. Its main points depend upon the existence of others which have been alluded to before, and as it seems to be somewhat harsh in its aims I think it might very well be forgotten.

Then as to "Voluntary measures on the lines followed in Denmark by Bang." Bang's system no doubt is good enough for Denmark, but what suits Denmark would not perhaps suit this country. There are a great many things that look very well on paper, and those who have been to Denmark will tell you that the whole thing is admirable there, that it ought to be adopted universally; but they confess that there is a difficulty, and even Bang himself confesses that there is sometimes a difficulty in having his plan adopted. But I should think there are some owners in this country who are willing to adopt it, even if they have not already introduced some of the principles advocated by Bang.

(C.) "A national system of compulsory sanitation and disinfection of cowsheds and farm premises." What does that mean? Does it mean the rebuilding of a number of the farm premises in this country? I should think it means rebuilding 75 per cent. of the dairy cowsheds in this country. Is that a small order? Is that an order that landlords in the present day of rebatement are likely to sanction and approve? Suppose that this compulsory disinfection, the cost being defrayed partly by the landlord and partly by the tenant, is carried out, is the tenant in his present position in a financial condition to sanction any such outlay? He says, "These sheds have been there since my father's time, and my grand-father's time—and we have had tuberculosis all the time. I do not see any good disinfecting them unless we kill all the animals." When are you going to get sanction to kill all the animals until you compensate? The cost of disinfection on certain farms, I will not say all, but on three-fourths of them, would far exceed the means of most owners, They would object; it would mean rebuilding. But I notice that Mr. Lloyd says it is a national system. I do not quite understand what he intends to convey by a "national system," unless it means that it will be carried out by the whole-time veterinary officers, who will be going about with formalin and spray producers. He also says under this paragraph "That owners of insanitary cowsheds be compelled to put them in good sanitary order" "That occupiers of cowsheds be compelled to keep their premises clean and free from tubercular infection." How is this to be done? By exposing plates at certain periods of the day, week by week, catching microbes, testing, ascertaining if the premises are bacteriologically clean? It is not within the range of practice: why discuss it?

(D.) "The institution of a National Veterinary Service of Public (animal) Health to carry out the measures just indicated, also to educate the public and advise agriculturists to take action," with both of which I agree. I think Mr. Lloyd is to be complimented upon that paragraph. There is no doubt there is much need for a Public Health Service in this country, and no doubt the public should be educated and advised. The few attempts that County Councils have made to educate the public as to the danger of disease in animals have not met with a very warm reception from the veterinary profession. I notice—and the complaint recurs—that when a veterinary lecturer attempts to instruct the public—to educate the public, to use the term employed by the author, he is very often called in question by the papers, if not at the meeting, for trying to educate the public, because this education is calculated to diminish the income of the practitioner. It is a small-minded objection, but I believe in some instances the cause of the complaint is distinctly well-founded. It is owing to the want of discretion, or what we may call tact, on the part of the lecturer, the person who is to instruct the public. He goes too far; he gives away what I am not ashamed to say are trade secrets, and sometimes he no doubt spoils the income of the neighbouring practitioners. Then as to advising agriculturists to take action, you cannot do too much of that. The agriculturist is of a stubborn temperament; he is not easily moved. You may preach to an agriculturist all your days, and you will never make him alter his mode of action ; but still continue by all means advising the agriculturist. Advise him for his own good not to keep open cases of tuberculosis in his cowsheds, to slaughter them, to cut the loss or to share the loss. Go on advising him, but he will not move until the Government compels him to do so.

Mr. F. W. GARNETT, J.P. : I should like to say a few words on this important question, because it is one which was very thoroughly threshed out at the recent Public Health Congress at Buxton. To hear Professor Macqueen one would imagine that we had to make no effort at all to eradicate tuberculosis from the animals of the country. A more depressing speech I have never heard. He advocated a kind of *laissez faire* action. He told us that we might talk to the average agriculturist for the rest of our days, and that we should get him to do nothing. If that is so, why not put certain forces into action which will compel him to do something ? We want to look at the preventive side of this question of tuberculosis, and to do that we must have Parliamentry powers. It is quite true, as he says, that the agriculturist will not part with his tuberculous cow unless he can get something for it. At the present time he tries to palm it off, through the auction marts or by other means, on to his neighbour, or perhaps it may be a butcher in the town. Fortunately the agitation which has been going on in this country has put a force behind even a pessimist of Professor Macqueen's type, and that force is that the public are now demanding what they have a perfect right to get, what they do get as near as possible in every other thing that they buy, and that is that the article they buy shall be of a certain standard of purity. Such great public pressure is now being brought to bear upon the farmer that he is realising the situation. It is becoming critical to him, and if he does not fall in with the public demand for a pure supply of milk, whether he gets compensation or not I hope that power will be put in the hands of the hands of the public authorities to compel him to give a pure supply of milk, in so far as at least that it shall not contain the germs of tuberculosis. Knowing that we have that as our basis, I think Mr. Lloyd is perfectly justified in the remedies he suggests. Perhaps he may go a little too far in some of his concluding remarks, but certainly something will have to be done on the lines which he suggests. And the preventive side of this question can be carried out I think without very great sacrifice of the public funds if it is done gradually. As Mr. Stockman has said, we know that once a disease such as this is tackled the financial aspects become enormous. But let us keep ourselves if possible to the simple preventive side of it ; and to get to the preventive side of it we want to eliminate what Mr. Lloyd calls the "open" cases. I do not want to use the term "clinically affected," because that raises a great question as to what we mean by the word "clinically" ; but by that term "open" as he uses it, I take him to mean those cases in which the owner of the animal himself has his suspicions aroused that the animal is suffering from consumption—those cases which a veterinary surgeon will, in the great majority of cases, diagnose as consumption without the use of the tuberculin test. These open cases are certainly the dangerous cases, and the ones that we have first to eliminate. That will reduce the number and the amount of money required for compensation to a very much smaller amount than if we used the words "clinically affected," because when an animal is clinically affected, that is, when we can say definitely by the tuberculin test that it is suffering from tuberculosis, then the question becomes a very big one from the money point of view. Therefore I suggest we should eradicate these open cases first, and on the other side empower the local authorities to work on the preventive side, *i.e.*, empower the local authorities to advance money to the owners to put up suitable buildings, which will have a certain cubic capacity, say, from 600 to 800 cubic feet, with efficient ventilation and light, together with a pure water supply in each shed. I think this might be done on the lines which were employed when Commons were enclosed in the early decades of the past century. Large sums of money were then advanced by Parliament to the owners of those enclosed Commons so that they could fence them, drain them, and make them fit for agriculture. Many hundreds of thousands of pounds were advanced in my own country alone for that purpose, every penny of which has been repayed years and years ago, without the public ever feeling that it owed a penny for this great agricultural improvement. Why should not the same lines be employed in increasing the sanitation of our cowsheds? As Professor Macqueen has said, at least 75 per cent of our cowsheds require remodelling, and they can be remodelled if the money is allowed to be borrowed on the security of the rates and repayed in a reasonable number of years. By these two means the open cases of consumption in cattle would be eliminated, and by providing sanitary buildings you would gradually eliminate all fears of contamination from those animals which are not so seriously affected. I hope that in the near future a great advance will be made in the elimination of tuberculosis among our stock. I, at any rate, am not hopeless on this point.

Mr. E. L. DIXSON: I should like to say a few words on this question of tuberculosis in cattle. There are cases, as every country veterinary surgeon knows, where he is called upon to test the cows with tuberculin on account of pressure being brought to bear by the parents of children as to the healthy condition of the cows, and where it is impossible to give a certificate without the test being applied. But the ridiculousness of the application of the test is this. During the last twelve months I have injected with tuberculin two herds, one of 117 and another of 131 cows, in which over 50 per cent of the animals reacted. Is it likely that the dairy farmer is going to slaughter or get rid of all those cattle, and buy fresh ones? Of course they give the satisfactory answer to their clients and customers that the test has been applied, but they do not go so far as to say that these cows that have reacted have been eliminated from the herd. Therefore it is perfectly ridiculous and nothing but a farce that the animals should undergo tests under present conditions.

Mr. W. HUNTING: I rise to suggest to the meeting that the discussion on this paper is worth adjourning to to-morrow morning instead of trying to finish it now. I therefore propose the adjournment.

Mr. J. CAMERON seconded the motion, which was carried.

SECOND DAY.

Wednesday, August 12th, 1908.

Mr. R. ROBERTS, President, in the Chair.

MEMORIAL OF THE LATE HON. TREASURER, MR. F. W. WRAGG.

THE PRESIDENT: Before we resume the discussion on Mr. Lloyd's paper, I will ask Mr. Simpson to make a statement to us.

MR. J. F. SIMPSON: Mr. President, some few of us last night, indeed before last night, had considered a question which I think will appeal to all the members of the National Veterinary Association and to the profession generally. You know perfectly that one who was of us has been called away: I refer to our friend Mr. Wragg. He was a prominent member of the veterinary profession for very many years; he was a man who was respected by all, and by many loved. It is thought that we should not altogether lose sight of him, but that we should have something to remind us of a man whom we all respected; and it has been suggested by some few of the members that I should suggest to you to-day that it would be the wish of the profession that we should obtain something which would remind us of his good qualities and of the friendship which we all enjoyed in connection with him. It is suggested that we should endeavour—and I feel sure the endeavour has only to be brought before your notice to command success—to raise a sufficient sum of money to have a painting made of the late Mr. Wragg, and that we should ask the Council of the Royal College of Veterinary Surgeons to accept it, in order that it may hang in the Council Chamber, where Mr. Wragg spent so much of his time for the benefit of the veterinary profession. The idea is not an extravagant one, and it is thought that, we will say, a sum of a hundred guineas would enable us to have a good painting worthy of our late friend, and worthy of the Hall which it would adorn. I have the names of three or four gentlemen who have expressed their desire to serve upon a Committee for the purpose of carrying out the object. I do not wish to press the matter upon individual members; I would rather it came spontaneously from them—that they should hand in their names to me saying whether they would be desirous of serving upon the Committee. The work which the Committee would have to do would be of a very light character indeed; meetings in connection with the object would be very few, and not only would it not involve much labour, but the subscription of a Committeeman would be precisely the same as that of any gentleman who was not serving upon the Committee. If, gentlemen, you will come to me at once and tell me whether you are willing to serve upon the Commtttee I shall be glad to receive your names. I feel sure that this object will commend itself to every member ; and although every member present may not be desirous of serving upon the Committee, I feel sure that we shall have the support of the whole of the profession in raising this comparatively small sum to do honour to one who was a great friend to this Association, and a great friend to the profession (Cheers).

The President : I will now ask Mr. Della Gana to read us his Report of the Congress of the Royal Sanitary Institute at Cardiff, which he attended as our delegate.

Report of the Delegate to the 24th Congress of the Royal Sanitary Institute.

Mr. President and Gentlemen,—As your duly appointed delegate, I attended the 24th Congress of the Royal Sanitary Institute held at Cardiff from the 13th to the 18th of July last. The addresses delivered and the papers read covered a wide field and much fresh information was disseminated by experts. The Sanitary Institute serves a noble purpose, it is one of the most powerful factors in the welfare of the community, its objects are the highest.

Proceedings opened with a reception of delegates at the City Hall by the Lord Mayor and Lady Mayoress. At 8 p.m. the same evening the Inaugural Address to the Congress was delivered by the Right Honourable the Earl of Plymouth, who, in popular language, drew attention to ancient and modern construction of dwellings from an hygienic point of view. He emphasised the necessity of fresh air and open surroundings, and said that in some respects present day architectural designs are often opposed to the simplest laws of hygiene. Finally, he reminded the Congress of the urgent need of placing sanitation within the grasp of all in such a simple form that the poor, the ignorant, the indolent and the indifferent should have no excuse for misunderstanding.

On the 14th, the second day, as your delegate I attended Conferences of Medical Officers of Health. Interesting papers on Sanitary Science and Preventive Medicine were read and discussed. Proceedings commenced with a Presidential Address by Dr. W. S. Davies, who after dilating upon the present position of preventive medicine urged the establishment of an efficient sanitary service. In view of the recognised importance of contagion and infection some means should be found by which every district would be in a position to obtain facilities for the investigation of disease. Medical Officer of Health should be a "wholetimer" and devote himself solely to State medicine and Municipal duties, assisted by a competent staff of Inspectors under him. Sanitary assistants should confine themselves to the disposal of nuisances, the most important department of which is the suppression of contagious and infectious diseases. There arose a controversy regarding the rights of Medical Officers of Health and private practice.

The discussion which followed clearly showed that the feeling of private practitioners is such that the Medical Officer of Health should confine his duties to State medicine alone and not interfere with the rights of private practitioners. It occurred to me that if these conditions were applied to members of the veterinary profession, and insisted upon by the Board of Agriculture and Fisheries etc. it would lead to a much better understanding amongst us. The time cannot be far distant when the Veterinary Officer of Health and Medical Officer of Health will work in sympathy quite apart from the private practitioner.

An interesting paper on the Medical Inspection of School Children was read by Dr. H. Meredith Richards, who suggested that leaflets should be issued to school teachers couched in simple language giving directions for dealing with common defects in school children, thus teachers would be the first to notice the early symptoms of communicable disease. No suggestion was made to the effect that the teacher should report to a policeman. This somewhat reminds us of the present-day working of the Contagious Diseases (Animals) Act, and the distribution of knowledge by Board of Agriculture. Possibly if the same conditions dealing with contagious and infectious diseases amongst animals were, in a modified form, applied to the suppression of communicable disease amongst school children we should hear much less about medical inspection. Concealment of disease in the human subject is at least as serious as concealment of disease in the lower animals, and should be held punishable as a criminal offence.

Modern socialistic legislation, relating to infants and children, who are vaccinated, fed, clothed and educated at the expense of the State, is gradually annihilating parental responsibility, and letting them off scot free for wilful neglect at the expense of the ratepayers.

On Wednesday, July 15th, I again attended the same section, *i.e.* Preventive Medicine and Sanitary Science, and heard an interesting paper by Dr. W. G. Savage on the examination of sausages and their hygienic preparation, in other words the bacteriological contents and histological construction of sausages. After dilating upon the various sins of sausage makers, the essayist emphasised the necessity of greater supervision. Many cases of food poisoning, or as it is more popularly termed ptomaine poisoning, could be traced to the consumption of sausages of doubtful origin, notwithstanding the severe sterilization which such an article of diet usually receives during the process of cooking. Apparently sausages may be composed of anything ranging from good pork or beef down to the flesh of the domestic cat or dog, *plus* starchy material and 50 per cent. water. No exception was taken to the use of horseflesh, which is of high nutritive value, provided that sausages were distinctly labelled as such. Presence of boric acid was not objected to granted that it did not exceed 10 grains to the pound weight of material, which would be sufficient to prevent decomposition for a period of two to three days. Bacteria most prevalent are bacillus coli even to the extent of 120,000 per gramme, in fact are always present in sausage meat, as is bacillus enteritidis from infection. Most fruitful source of contamination are sausage skins, due to imperfect and careless preparation. Dried and salted skins are to be preferred, as the process of salting is sufficient to eliminate intestinal organisms. The preparation and immediate use of sausage skins by butchers from recently slaughtered animals is an objectionable practice, as in these cases the intestines are only washed out with water several times, then placed in salt and water and used in a fresh condition, whereas the difficulty of cleansing the intestines of bacteriological contents is obvious. Many cases of meat poisoning or ptomaine poisoning have been traced to the presence of bacillus enteritidis in sausages which produce a heat-resisting toxin upon which efficient cooking has no effect. As bacilli enteritides commonly affect swine, and are usually present in their intestinal contents, the danger of using imperfectly prepared sausage skins is a real one. Having in view the reported concealment of outbreaks of swine-fever in this country it would be interesting to know whether there is any connection between these and cases of ptomaine-poisoning in the human subject *i.e.*, in districts where swine-fever has been known to exist.

Sick and ailing swine are frequently consigned to the sausage mill. Efficient meat inspection should include all kinds of sausages—which examination should be chemical, histological, and bacteriological.

On the 16th I attended a Conference of Sanitary Inspectors and heard a paper on the subject of the "Dairies and Cow-sheds Orders in Rural Districts, and a better Milk Supply," by Mr. Josiah Bradley. The essayist pointed out the difficulties of enforcing the Dairies and Cow-sheds Orders in rural districts owing to the want of uniform legislation. He suggested that a standard of 600 cubic feet per cow should be adopted, and that the milk question should be dealt with at the actual source—the farm—in order to ensure that milch cows are in a healthy condition, and provisions for enforcing personal cleanliness on all persons who are engaged in the milking of cows and distribution of milk. A resolution was passed and forwarded to the Royal Sanitary Institute urging that the question be put forward with all possible speed.

July 17th. Conference of Medical Officers of Health: paper by Dr. Howard Jones, "Necessity for a standard of cleanliness in all Milking Competitions at Agricultural Shows," in which he pointed out the utter disregard of those sanitary precautions by milkers which would assure a pure milk supply. A long discussion took place in which your delegate took part. Finally a resolution was put to the effect that the Council of the Institute be asked to draw the attention of the leading Agricultural Societies and show committees to the necessity of insisting upon a proper standard of cleanliness in all milking competitions.

Other papers of equal interest were read, the most important and interesting from a veterinary point of view was one on "Human Carriers of Typhoid Infection," by Doctors Chalmers, Savage and Davies. It was shown and conclusively proved that it is not the clinically diseased who were a danger to the community, but an apparently healthy person may innocently harbour the infection of typhoid for years and meanwhile convey it to others whose natural immunity is less. It occurred to me that we have an excellent parallel in this respect, and possible explanation, in the many instances of so-called "sporadic" outbreaks of swine-fever and other infectious diseases in the lower animals which we frequently hear of.

Then followed a paper "Remarks upon the Sanitary Service of the Territorial Force," by J. Arnold Jones, M.D. I am sorry to say that throughout the paper the existence of the veterinary officer was quite overlooked if not ignored. Fortunately Mr. Percy Howard, F.R.C.V.S., a delegate of the C.V.M.S., who was present directed the attention of the meeting to the omission and I think with some effect. Mr. Howard pointed out the importance of the Medical and Veterinary services combining their energies for the maintenance of a high standard of sanitation in military camps.

The last day of the Congress, but by no means the least important, was devoted to a Conference of Veterinary Inspectors, at which I was pleased to note the large number of Medical Officers of Health and Municipal representatives who attended our meeting and took part in the discussions.

Proceedings were opened by a very able address by the President, Professor J. Penberthy, which dealt mainly with the subject of Meat and Milk in relation to Animal Tuberculosis. He stated that dissemination of crude and immature opinions was obstructive to the application of expert knowledge, scares arising out of misrepresentation and exaggeration had a deterrent effect upon the crusade against tuberculosis in man and animals. Our experience of meat inspection would show where it was carried out uniformly and systematically by officers having an intimate knowledge of animal diseases and pathological processes, and actuated by sound common sense, the public were amply safeguarded against the risk of tuberculosis from consumption of home-killed animal flesh and the trader had little to complain of from unjustifiable seizures.

He insisted that such highly important duties as the inspection of meat should be exercised only by those who possessed the requisite knowledge, and strongly advocated a general and uniform inspection.

It is nothing short of a national disgrace that a large proportion of animal flesh offered for sale is not subjected to inspection and that there is in the greater part of the Kingdom no check upon the traffic in diseased meat and cattle. Figures indicated that the food of infants rendered them specially liable to tubercular disease and the inference seriously incriminated cow's milk, which from change of parental habits had come more into use as an article of children's diet than formerly.

Statistics relating to the incidence of tuberculosis showed that a material diminution had taken place at all ages, except the milk drinking age. Whatever be the conection between diminution of tubercular bacilli in cow's milk and the disease of tuberculosis of children of the milk drinking age it was quite safe to assume that the effect was largely due to the action of those authorities who with other hygienic improvements had included the veterinary inspection of cows, dairies, etc. The eradication of tuberculosis must be the ultimate goal. Conditions favourable to the general health of the cow are usually opposed to contagion.

Two papers were read on meat inspection and tuberculosis—one by Mr. J. W. Brittlebank of Manchester, and the other by Mr. Andrew Watson of Dublin.

Mr. Brittlebank dealt with practical methods of dealing with tuberculous animals and showed the necessity for Government supplying funds to enable agriculturists to clear their herds of tuberculous animals. He calculated that in this country there are a million dairy cows that are affected with tuberculosis and that 2% gave tuberculous milk.

Mr. Watson urged that all meat inspection should commence with the inspection of animals during life. Tuberculine he said was the only reliable means we have of clearing up all doubts, but unfortunately in a fair or market time the place precluded its use. If we can secure compensation for the owners of cattle affected with tuberculosis where they are sold for food not knowing them to be affected, he thought that it would only be right to condemn all carcases affected slightly or otherwise. In the case of swine Mr. Watson rightly condemned all carcases no matter how slightly affected.

Councillor Morgan Hopkins expressed an opinion that tuberculosis had been caused by the process of inbreeding amongst the so-called fashionable herds of the country, which is particularly noticeable in the shorthorn herds. What is required is a thorough and uniform inspection of cattle and dairies throughout the country.

The President was then requested to convey a recommendation to the General Meeting asking that the law should be made more general and uniform, and that increased powers should be given to veterinary inspectors.

This, gentlemen, closed the proceedings, and your Delegate retired. I trust that you have listened to my report with as much interest, as I found in the instructive meetings of the Congress.

William A. Della Gana, F.R.C.V.S.

The President: I am sure you have heard with a great amount of interest the excellent Report our delegate has placed before us of the Proceedings at the Health Congress at Cardiff. It is a very valuable Report, and I hope everyone will take the opportunity of perusing it at leisure. We cannot discuss it now, and I therefore simply propose that the very best thanks of this meeting be given to the delegates who attended the Buxton and Cardiff Congresses for attending the meetings, and their labours in writing the Reports which they have given to us.

The resolution was carried by acclamation.

Resumed Discussion on Mr. J. S. Lloyd's Paper on "Tuberculosis in its Relation to Meat and Milk."

The President: As Mr. Hunting moved the adjournment of the debate, I will ask him to resume the discussion.

Mr. W. Hunting: Mr. President, I am extremely sorry that, in a weak moment yesterday, I proposed the adjournment of the debate. I did so having forgotten the penalty attached to it. No doubt you have all read a portion of Mr. Lloyd's paper—I have myself; but those who have not read the whole of the forty-two pages will find a good short summary on the last two, which sum up exactly the opinions that Mr. Lloyd wishes to impress upon us. I was pleased to find that in his paper he suggests the necessity of scheduling the disease, that is to say, of scheduling it under the Diseases of Animals Act so that it may be treated as other diseases of animals. Mr. Lloyd says that he would schedule "open" tuberculosis, but you do not want to read very far on in his paper to find that that would really include all the tuberculosis you could detect in any way. I am inclined to doubt whether, under the scheduling of tuberculosis, it would be advisable even to permit the use of tuberculin, unless there was a dispute between the owner and the inspector. The use of tuberculin at once opens up all the difficulties of the matter. As men differ intellectually, it is just as well to remember that if the disease were scheduled regulations would apply to the whole country and would be brought into effect by various people, and too much power would probably undo all the good that the scheduling would do. If inspectors began to use tuberculin they would very soon frighten the stockowner, because if they acted upon its indications they must at least enforce isolation. The practice of isolation means that some men would require more fields and some would require more farm buildings. What that would cost I do not know. Mr. Lloyd will probably tell us it would amount to some millions of money which the landowner could not find. Then Mr. Lloyd says he would help to control the disease, not only by scheduling it but by adopting as much of Bang's voluntary method as he could. That is open to anybody to do now: any of these voluntary arrangements can be now carried out. I take it the only expense would be the tuberculin. Whether that should be under the Local Authority or under the State is a question. If you ask the Local Authority to do it, they would have to pay; if you ask them to pay, they would prefer not to do it.

Then as to sanitation, Mr. Lloyd suggests that we should have to make same compulsory regulations for sanitation, including cubic space and ventilation. I am inclined myself to think that the cubic space and ventilation idea is run for a good deal more than it is worth. They are both founded upon the old idea that tuberculosis was spread by inhalation. You see some of the best formulated and best constructed cowsheds, with a continuous glazed tile manger in front of them, to look at structurally one of the most perfect pieces of work you could find—cleanly, clean, light and everything else, and yet it is necessary to have only one tuberculous animal at the top stall to infect every other animal all the way down through ingestion. I am not going to argue this question of inhalation and ingestion just now; it is hardly necessary, because with the exception of many antiquated doctors, and a few antiquated veterinary surgeons, I think ingestion is now being accepted as the chief cause of the spread of the disease. There is a great deal of nonsense talked about spitting. People seem to have gone mad because pathologist have found sputum with bacilli in it, and they have therefore imagined that spitting was the great way of spreading the disease. You never get into a 'bus or a tramcar or go into a building without seeing a notice up, " Please do not spit "—not from any aesthetic point of view, not from the unpleasantness of the sight, but for fear that we should inhale a stray bacillus which has come out of the dried sputa and then floats about in the air. It is too ridiculous ; in fact that inhalation theory was only adopted as a sort of excuse when they found that the old volatile notion was wrong, and that a particulate bacillus had been proved. They would not give way, so they invented the dry dust theory to account for the spread of the disease through the air. With regard to experiments, I had better meet that objection at once. It is pointed out that two or three men have experimentally produced tuberculosis by inhalation. It is never pointed out that in every one of those experiments no precautions were taken, or could have been taken, to prevent all that collected in the pharynx and the nose being swallowed by the animal. So that, after all, I do not think we need trouble so much about the cubic space and the ventilation ; and that gets over a tremendously big question. What you have to keep in view is that it is a contagious disease, that it spreads by contagion only, and that means detecting the disease and stamping out the animal that is spreading it.

Then Mr. Lloyd suggests an organised veterinary service, I suppose State and Municipal. That means really an increase in the numbers of the present inspectors, and no doubt he used the word "organised" meaning that they should be put on a very different footing to what they are now, in fact that they should be organised. Then there is the money to be found. That is a very difficult question, because if the State finds the money naturally it wishes to interfere. If the Local Authority has the money, as a rule unless they are compelled they will do nothing to spend it. I think tuberculosis is just one of the few diseases that can be controlled better by local effort than by a central State effort. Tuberculosis has a long period of latency. It is a disease in which the premises must be kept under supervision for a very considerable time. Even with the tuberculin test, it would be perhaps eighteen months before you would be able to say that you had the premises clean. If the work is to be done in the best way, that is to say, by the Local Authority, then I am afraid the Local Authority would have to pay most of the expenses. This matter of expense meets you in every direction. The paper deals with tuberculosis in relation to meat and milk. Now both the producers of meat and milk at the present time suffer considerably, and I am inclined almost to say innocently. Neither the milk producer nor the meat producer can be sure of what they are buying, but the man who sells to them can be sure of what he is selling. I know some great authorities say that it is impossible for a man to detect tuberculosis among his stock : I also know that owners do detect it among their stock, and get rid of it. The only man who can detect it and get rid of it is the farmer and the stockowner. The stockowner at the present time is in the happy position of being able to sell to the butcher and the milkman his diseased animals, and the butcher and the milkman are in the unhappy position of having to be fined or stand the loss of these animals that they have innocently bought. The whole thing is wrapped up in the question of payment. Somebody has to be paid, and the person who suffers the loss is the person I think who should be paid. To go to the source of things is the proper thing to do—the man who has the first loss should be paid, and I should only pay one. I should not pay the butcher any compensation, and I should not pay the milkman any compensation, but I should pay the farmer—the owner, compensation when I killed his animal, and I would arrange that the butcher and the milk producer had a Civil Action against him if he sold them a diseased animal. There is no more just principle of law than, that if a man sells a thing for a specific purpose, and it is found that it is not sold correctly—that it contains something which it ought not to contain, or something is left out which ought to be there, he should be responsible for it. It would be a very easy matter indeed to say that bovines sold for meat or milk should be sold subject to an understood contract that they should be sound for the purpose, say, for ten days. A law that would say that a man who sold an animal for meat or milk should be held responsible for its being free from tuberculosis for fourteen days would put a stop to all the hardship suffered by the butcher and milkman, and it would leave the farmer to take his own preceutions, which he could do easily enough by the aid of a veterinary surgeon and tuberculin, to know whether he was safe in selling. One ought perhaps—and if I lived in the country and was a country practitioner probably I should—to sympathise with the farmer more than I do, but I think the farmer's callous indifference to the requirements of other people is something too shocking. I know no man who is more indifferent about his diseased, dead, or dying animals. When I was a practitioner in the country it was thought a shocking waste of property not to have cut an animal's throat, either after it was dead or just before, and sent it for food into the neighbouring town. The farmer never dreamt of burying the thing, and even if the disease was anthrax or tuberculosis the farmer carted it off, or got a man to come and give a sovereign for it; and now he rather resents any interference with this poisoning of the British public, and he wants to be paid not to do it. The butcher, who is smarting from constant losses suggests, very mildly, a mutual insurance, but the farmer says "No, I will not part with a halfpenny." They have tried to get this insurance to go in many districts, but it has been successful in very few. The butchers now threatened to try a boycott, but they are, I fear, not strong enough or united enough. I do wish the butchers would combine and boycott the farmer. If the butchers could hang out for about a month, the farmers would have to give in, and then they would do, as they always did, fall back upon some other prop—the Board of Agriculture; they would get the Royal Agricultural Society to suddenly find that they and their interests were suffering shamefully from the action of the butchers, and would call upon the Board of Agriculture to come to their help. They would say, "Give us anything you like, control us how you like, but save us from the butchers."

What is the real difficulty about bovine tuberculosis? It would have been scheduled long ago if it had not been for the Royal Agricultural Society of England and the pedigree stock-owners and land owners, who form the majority of that body. It may be an agricultural body, it is certainly a political body, and is run on political lines. The pedigree owners know that the stock is so infected with tuberculosis that, if they were obliged to notify, their trade would suffer, and therefore for their own interests they encourage no law to prevent the spread of disease all over the country, and set the example to the little man to do the same,

Mr. F. L. Gooch: I am very glad indeed that the latter remarks of Mr. Hunting with regard to the pedigree breeders of our country are not true. Some of the finest shorthorn breeders are doing their utmost to exterminate tuberculosis in their herds without interfering with the public.

Mr. Hunting: What do they do with the reactors?

Mr. Gooch: I know several cases in which the largest shorthorn breeders of the country are now having their herds tested regularly with tuberculin, and every animal that reacts is slaughtered and buried. I can mention several in my district, some of the finest shorthorn breeders in the country. I will only mention two, Sir Oswald Moseley and the Marquis of Exeter. Their animals are tested regularly, and every animal that reacts is slaughtered and buried. I believe Professor Macqueen suggested yesterday that this should emanate from the owners first, and I think that is being proved by what is being done by some of the largest breeders, particularly shorthorn breeders. Those of us who have to attend some of the largest shorthorn sales in the country know that it is impossible to sell an animal to a foreigner that has not passed the tuberculin test. It would make a difference of hundreds of pounds to our large shorthorn sales if the animal had not passed the tuberculin test for a certain time. If an animal has reacted, no foreigner will buy him to go abroad; and therefore from a financial point of view a great many of our large breeders and sellers of shorthorn stock are doing this for the sake of their own pockets, and for the benefit of the country as well. I am surprised, on the other hand, to see the advanced cases of tuberculosis of the udder and lungs that come to some of our largest slaughte rhouses and markets. That such animals should be allowed to come into our public markets is a disgrace. Mr. Hunting said something to the effect that he would not compensate the butcher nor the milkman, but that he would give the compensation to the farmer. I should like to ask him how we are to trace the owner of the animal. A large wholesale dealer goes round the country to the big markets for three or four weeks and buys up a lot of animals, apparently good stock, and it would be impossible for that man, after he had slaughtered, to say from whom he bought one particular animal. We have had a case in which four animals out of eighteen, which cost £22 10s. each to the butcher, were condemned with tuberculosis and destroyed, and it was impossible to trace whom those animals were bought from.

Mr. Hunting: The butcher would not need to trace; he would simply come on the seller.

Mr. Gooch: The seller is generally a public salesman; he is only an intermediate man, and it would be impossible to make that man pay.

Mr. Hunting: The public salesman knows who he sells for and has found no difficulty about ownership where a mutual insurance is adopted.

Mr. Gooch: A great many of us in the study of this tuberculosis question have lost sight of the fact that, in its contagious form, there must be a predisposition on the part of an animal that takes the tuberculosis. I believe it is a generally accepted fact in the medical profession that possibly everyone of us has at some time or other had the tubercular bacillus in our own system, but unless there is a proper nidus for the growth of the bacillus it will not grow. I believe that is equally true of healthy cattle. Mr. Hunting was very hard on the farmer. I wish he would come down for a month to some of us in country practice, and he would then know a little more about farmers than he does at the present time, according to the way he talks. You would be surprised at the amount of fear the farmer has when he has an animal die on his premises at the present time, and you will get no farmer to send any animal that has died or has been found dead on his premises to any place in his own name. You will find at the present time they are most particular, and that they will not send any diseased carcase to any place. I am very glad indeed to find that our magistrates are putting such a heavy fine upon them that it is almost impossible from our country districts to send such an animal into any of the towns. None of our farmers will take the risk, either in sheep or cattle. Then 800 feet of cubic space have been referred to. I believe it is one of the laws of the Dairy and Milkshops Order that if a dairy is under that Order it must have that amount of cubic space. You will find in nearly all our provincial towns now that every dairyman has a cowshed with the proper cubic space, and the sanitary inspector of several of our smaller provincial town will not allow any dairy to be conducted unless it is under the Cowsheds and Milkshops Order, so that there will be the necessary cubic space provided for every animal.

I think this discussion might go on all day if all the members who wish to say anything were allowed to speak, but as that would interfere with the other paper I will not say anything more, although there is a lot more I could say.

Mr. John J. Bell: I support what the last speaker has said in taking the part of the agriculturist. I did so at the debate on this subject many years ago at the Doncaster meeting. I well remember that the President on that occasion was Professor Axe, and he called me to order by saying that we had met for a scientific discussion and not a talk about agriculturists. I think some of the speakers in the course of this discussion have spoken very harshly against the agriculturist. I have been all my life a practitioner in a large agricultural centre; I know well the feelings of the farmers, and I can state what the last speaker has stated, that I have been called upon to test whole herds of cattle, in one case on a very large property large numbers of fine Galway cattle. Therefore the testing is not confined to the shorthorn tribe, as in this instance one of the best herds of Galway cattle in the north was tested. The circumstance which led to my examination of the cattle arose from a lady of title attending her sister's funeral in Ireland, where she was told that her sister had died from tuberculosis by drinking the milk of diseased cows. She came home and told her husband that she would have all the cattle tested. I thereupon set to work to test a very large herd of cattle, and on finding that a very large number of them reacted I said to the owner, "What are you going to do?" He said, "We will kill them." Then I asked, "What will you do with the carcasses?" "Bury them." We stamped out the disease there, and the remainder of the herd was sold off. Since then no cattle have come on the place without being tested before they are allowed to come in, and we have now a healthy herd of cattle. I only give you that as an illustration of what can be done by prompt action. With regard to arrangements between butchers and farmers, I am pleased to say that we have advanced to this stage in Carlisle. We have an arrangement in the fat markets there, not in the stores, under which the butcher pays a shilling and the farmer a shilling a head upon the stock that is sold for slaughter. By that means a fund is established for compensation purposes. It does not bear very heavily upon the butcher, although he does not get full compensation, but only a proportion of the price paid back to him when an animal is condemned. In my district I have had a good many cases where the owners of cattle have yielded to my advice and we have eradicated the disease, but it purely becomes a question of £ s. d. at the finish. Can you expect the whole of the agriculturists of this country to allow their stock to be tested and to be slaughtered without compensation? With regard to the Dairies Act, in our county like many others the farmers send their products, their milk and cream, to other towns. What is taking place at the present time? These dairies and Dairy Companies require a certificate from the owner who supplies them that the cows have been tested with tuberculin before they will continue their purchases. It is only three weeks ago that I had to test a hundred cows, and probably you will not be surprised when I tell you that 75 of them reacted. What is that poor man to do? He is only commercially a business man. Is he to have the whole of those cattle slaughtered without any compensation? Is he to have his trade stopped because 75 per cent. of the cows reacted? There is not a finer herd of Ayrshire cows in the whole district; they have been chosen with great care for the appearance of the animals in health, but not under the test. They were a healthy-looking class of cattle, and yet 75 out of the 100 reacted. The glands are free, but is the milk to be condemned? Unless you schedule the disease and give compensation things will still remain in the same position they have been for the years and years I have been attending these meetings.

Mr. F. G. Sampson: I think we are all agreed upon one point, namely, that legislation should be passed dealing with that most insidious disease, tuberculosis. I do not think there is one of us who will dissent from that statement. But the question which gives rise to differences of opinion is the form the legislation is to take. Some of us say it should be from a central point of view; others say it should be from a local point of view. I am of opinion myself that there are two ways in which it can be done. In the first place, we might have veterinary surgeons, who should be compelled not to enter into private practice, who should do this work and nothing else. Another way would be to make each and every veterinary surgeon an inspector, compel him to report, pay him well for it, and fine him heavily if he did not report. That would be another very good way, and I will tell you why. It is not the large and extensive herds which are the disseminators of the disease, but the small farmer with one or two cows who is not licensed to keep a cowshed. He keeps two or three cows, and employs perhaps six or ten hands on his farm. Each of them probably takes home two quarts of milk every day of their lives, and each one of those men in all probability has six or seven children who drink this infected milk. These little farmers cannot afford to buy expensive stock; they buy an old cow which has been thrown out from a large herd, and so the disease is spread, not only in England but in many parts of Ireland. How is the present legislation carried out? In my district one local Board has the cows inspected and and another local Board does not. The consequence is that if a cow with a tuberculous udder is cast out by a veterinary surgeon in one district, she is sent into the market and sold by public auction, and goes into another district where such legislation is not enforced. Therefore I say that legislation should either be administered from the central authority, with properly trained men to see that it is carried out, or each and every veterinary surgeon should be an inspector.

Mr. James McGavin : I rise to endorse what Mr. Samson has said in regard to tuberculosis. There is a great deal of truth in the remarks he has made. We are all agreed that it is one of the worst diseases that can affect human subjects, and we are nearly all agreed that the greatest source of the continuance of this disease is the ingestion of milk, especially by children. We ought not to look upon the question from a pounds, shillings and pence point of view. The Old Age Pensions Act will take about 7 millions a year to sustain two or three old people after they come to seventy years of age. I think it would be better to look after the young people who are growing up and protect them ; they have all their lifetime before them. (Hear hear). If we can give 7 millions a year to pension old people we ought to give a few millions towards the protection of health and life in the young subject. (Hear hear). I suggest that if we are going to legislate at all we ought to act at once, and do it in small quantities. You will never get Parliament to pass a great number of measures in a big Bill, but I should make one thing compulsory, namely, that farmers should report any disease whatever in connection with the udder. I suggest that the farmer should communicate with the local authority saying that something is the matter with the cow's udder ; the local authority would then send an inspector, whoever he is, who would see the animal. If the animal is suspicious it ought to be branded, and close attention paid to it.

Mr. Samson : Of course you mean a veterinary inspector?

Mr. McGavin : Yes, only veterinary inspectors, who should test these animals with tuberculin. The farmer knows perfectly well when there is anything the matter with the udder, because he at once says, " I do not get half the milk from this cow that I used to." Any old woman who knows anything at all about the subject will tell you that. So that I would make the farmers, whenever they see anything the matter with the udder, report it at once ; the inspetor would then test the animal with tuberculin, then the animal should be branded and periodically inspected by a veterinary surgeon.

The President : Although many other members would like to speak on this subject, which bristles with points that might very profitably be discussed by this Association, I regret to say our time is so full today that we shall not be able to devote any more time to it. There is one point that has not been mentioned, and which I think that we as practitioners, whose opinion is very often asked in connection with these matters, should always bear in mind. We should think of the awful consequences that are entailed on the young children and on the youth of the country from drinking tuberculous milk. We might say that perhaps the only safety at the present time in towns in giving milk to young children to drink is that of raising the temperature. If the temperature of milk for the use of young children be raised to 160° F. for about twelve minutes, to 170° F. for fifteen minutes, or 180° F. for ten minutes it becomes innocuous and does not spread the disease. That is very important information which veterinary surgeons should try and spread. While trying to help in the good work of eliminating tubercle from the country, they in the meantime might be doing this very excellent work.

Mr. S. STOCKMAN: There is one important point which nobody has referred to which occurred to me while Mr. Gooch was speaking. You heard me yesterday speak in support of the agriculturist. Even if he has faults, I still think that is no reason for not treating him with justice. Mr. Hunting hit the nail on the head, I think, when he said that the loss had fallen on the man who could not get rid of tuberculosis. The farmer is the man, and I do not think he should be treated harshly because he is the only man who can get rid of tuberculosis, but until you put the loss on him you will not get him to move in the matter. But the subject I wanted chiefly to speak about was as regards what Mr. Gooch said about tuberculin. Mr. Gooch said that the foreigner will not buy an animal that has not passed the tuberculin test. It is really much worse than that. It is coming to this, that the foreigner in many places will not take the animal which has passed the tuberculin test. In the Argentine they have had to establish, at great expense, a quarantine service to deal specially with the animals imported. They keep the animals, imported mainly I am sorry to say from Great Britain, in quarantine for thirty days—it used to be forty days—in order to re-test them, because they found so many that had passed the so-called tuberculin test in this country did not pass it when they got over to the other side. What is the reason of that? Simply, this, that the tuberculin is sold without control (hear, hear). It has got so bad that the farmers have approached the Board of Agriculture and asked us to do something, to take on, as it were, under Government supervision the testing by tuberculin of animals going abroad. I absolutely refuse to do anything of the kind until you control the sale of tuberculin, and make it absolutely impossible for anybody but a veterinary surgeon to buy it.

Mr. J. J. BELL: I should like to suggest this to Mr. Stockman: Would it not be wise to make it penal for any man to test his animals and sell them after they have reacted? At present he tests them again and again before they are shipped, and we know very well that the animal is under a certain immunity between those times. That is the danger, that certain cattle bred in this country are supposed to be free because they have been tested a short time before the sale, and then when they are shipped abroad they are found out at the other end.

Mr. STOCKMAN: If they are tested with tuberculin the majority of them react, and if they react they should not be sold.

Mr. E. W. BAKER: May I ask Mr. Stockman if the trouble he points out relative to the sale of tuberculin would not be overcome by the granting of a certificate by a veterinary surgeon, and only that? Surely the fact that the animal had been tested by tuberculin by anyone would not be a sufficient guarantee of its freedom from tuberculosis.

Mr. STOCKMAN: You have mistaken me. I have had to examine a number of cases, and I always find that the veterinary surgeon is called in on a certain day, and when he comes to test that animal he finds it has already been injected with tuberculin by the farmer or somebody in his employ. He does not get a chance. I might have said more. A veterinary surgeon who tests for America, a Government veterinary surgeon, came to me and said, "If you do not believe me I will give you my black list, and you will be surprised at the number of well-known men who are on this list. I went to a particular place on a certain day and I found a lot of animals there with their temperatures up. I simply went away and declined to test."

The PRESIDENT: If the sale of tuberculin could be controlled there would be an end to the matter, but unhappily it is manufactured by various institutions in this and other countries, and if the owner cannot obtain it in this country he can from another. In that way the difficulty of controlling the sale of tuberculin in this country becomes greater. I will now ask Mr. Lloyd to be kind enough to reply to the discussion.

Mr. J. S. LLOYD, in reply, said: In the first place I think I ought to thank you for the way in which you have received my paper, and the way in which it has been discussed. The remarks that have been made have, to a very large extent, been answered previously by the matter which I have put in the paper. As many of you know, there is a great quantity of it which consists simply of extracts. It was purposely made big in order to cover the whole field if it was possible. I did not feel myself capable of expressing very strong opinions personally; I took extracts from more notable authorities, and left you to say what you liked upon them. As a matter of fact, most of the speakers have confined themselves to my suggested measures, for the prevention or suppression of tuberculosis which are set out on the last two pages. Mr. Stockman, who kindly undertook the opening of the discussion, mentioned the question of dividing the legal measures relating to cattle and putting them under the control of the veterinary surgeon, taking them away from the medical officer of health; *i.e.* that matters relating to milkshops, and that sort of thing, should be under the medical officer of health, and the cattle and cowsheds should be under the veterinary officer of health. That has been my contention all along. I think myself that veterinary surgeons should deal with animals, either alive or dead.

Mr. Stockman also mentioned a matter which I have thought a great deal about, namely, post graduate education. I think he suggested something better—a post graduate degree for men who have taken up State and Municipal veterinary medicine. I believe that some years ago, in 1899, the Council of the Royal College of Veterinary Surgeons did rather a foolish action. They were approached by the University of Aberdeen in regard to Aberdeen University granting a degree to veterinary surgeons, and they threw the matter out. I think it was a great mistake, and the result has been that we now have Liverpool granting a D.V.H., Manchester granting a D.V.S.M., London granting a B.Sc. and Edinburgh will soon be doing the same thing; and the unfortunate part of it is that if the Universities do not ask the veterinary surgeon to come in as an examiner, we have no guarantee that these veterinary degrees are anything like uniform. I think that is a great drawback. If we had examiners appointed by the Royal College of Veterinary Surgeons, and allowed the candidates to take the education where it was most convenient for them to take it as long as they passed an examination, they would all be on the same level.

With regard to my suggested measures, I have been a critic myself; I have criticised one or two people. Criticism can always be divided into two, destructive and constructive. I do not like the former; I prefer the latter. I think when you criticise any paper or line of action, that the one who does the criticism should be able to suggest something else in place of that which he condemns, and that was the reason I wrote this particular part of the paper. I did not expect everybody to agree with me. Unfortunately Professor Macqueen is not present now, because I was going to try and convert him. I will have another go at him privately. But I do not think there was very much between us when he finished, because he concluded by saying he agreed with several of the things which practically were dependent on what he had disagreed with a minute or two before. My idea was that if we offered farmers and agriculturists some means of getting rid of their tuberculous cattle, that is, by free tuberculin testing, with compensation for animals destroyed in the public interests, that at the same time we should compel them to take some steps to clear their herds of tuberculous cattle. That was the way I put it, that there should be presumption of knowledge, for instance, and that there should be compulsory notification. Unless you do put the screw on the farmer, with the system Professor Macqueen mentioned we will not get him to do anything, and that has been emphasised by Mr. Hunting this morning. The question of administration is one of very great importance, that is as regards whether it should be done by the local veterinary officer or whether it should be done by whole-time officers. I have purposely practically divided my suggestions under (*a*) into two, that there should be compulsory notification by the owners, and compulsory notification by the veterinary surgeons. When I stated that, I meant veterinary surgeons called in by the owners as their veterinary advisers; but for administrative purposes, and for carrying on the legal measures connected with them, I do think—and I emphasise it with all the force I am capable of using—that the veterinary inspector under the local authority should be altogether free from private practice. He would be in a much stronger position in dealing with refractory farmers, and there is no doubt that he would not be treading on the toes of any other private practitioner.

A matter mentioned by Mr. Garnett, and also by Mr. Hunting, is of very great importance, namely, the sanitation of cowsheds. Mr. Garnett's suggestion was that the Government should find the money. The tendency of the times is not to assist landowners ; it is rather to annihilate them. Under the Factory and Workshops Act of 1901, all owners of buildings which are made into factories have to put them into order to meet the desires and wishes of the inspector under that Act ; and I think myself that when farmers are compelled by circumstances to take up the sale of milk and to conform to certain regulations, if the owners were compelled to put the premises into a sanitary condition and the occupiers were compelled to keep them in that condition, that would be sufficient to meet the circumstances of the case. But another point has been raised with regard to the sanitation of buildings this morning, namely, the fact that, no matter how good the buildings are, if there are tuberculous cattle there, there will be tubercular infection. Even the late Queen had thirty-six tuberculous cows out of forty, and surely her cowsheds were up-to-date. I was rather struck with what Mr. Gooch said in regard to tuberculin testing. I was pleased to hear it, and I only hope myself it will be largely taken up. That I think meets my voluntary measures under (*b*). I know that Lord Rothschild has just started something on the same lines; he will not have any milking cows kept in his herd that are not capable of passing the tuberculin test. As Mr. Gooch has mentioned, the Marquis of Exeter and Sir Oswald Moseley are doing the same thing, and Mr. Bell has mentioned other gentlemen. There is no doubt that those districts will become educational centres to the farmers around.

Mr. Hunting mentioned the question of inhalation and ingestion. I mentioned that in my paper on page (57). It does not necessarily follow that, because tubercle bacilli are floating about in the air, the air passages will affect the system. The probability is that the tubercle bacilli are swept up out of the trachea into the pharynx and then swallowed, and that brings the infection back to the method of ingestion. The question of the insurance of cattle and warranty is an important one. I am sorry I overlooked it in my paper. A warranty is divided into two, an implied warranty, and practically a real warranty. It appears now that the law is—that if a butcher ordered a beast to be sent from a cattle dealer or feeder to his place to be killed, and it turned out to be tuberculous and was condemned, he would be able to get compensation under the Sale of Goods Act ; but if he went and picked the beast, he would be using his own judgment and would not be able to get any compensation.

If the farmers and butchers would combine, they would no doubt be able to get over the difficulty by a system of insurance which would not hurt anybody very much. I have thought myself that, where compensation is required for a beast that is well fed and is found to be tuberculous after slaughter, showing no symptoms previous to that, if the compensation was divided into four it would be a small matter compared with any one party having to bear the lot. My suggestion on that point is this, that the seller should pay a quarter, the buyer should lose a quarter, the local authority, which is the authority protected, should pay a quarter, and the Government should pay a quarter. If the compensation of £20 was divided into four, it would mean only a £5 note from each party. At the same time it would be some stimulus to the agriculturist to get rid of tuberculous cattle, and it would put some trouble on the butcher to try and buy cattle that were not tuberculous.

Several other gentlemen mentioned matters of minor importance, but I think, generally, I have replied to the discussion.

SKIN DISEASES OF THE DOG.

By Geoffrey H. Livesey, M.R.C.V.S., Hove.

Parasitic Diseases.

The dog and cat from their modes of life and from the fact of their bodies being covered with hair and fur are, like animals in a wild state, subject to the attacks of parasites. Most of these parasites excluding of course bacteria) belong to the animal kingdom. The most important are the Flea, Louse, Tick, Harvest-bug, and the Acari.

The dog flea (P. Serraticeps) is found on dog and cat, and with it is often associated P. Irritans (human) and sometimes with P. Goniocephalus (hares and rabbits). The flea is an erratic parasite, and may jump from host to host and may undergo complete metamorphosis on one animal. I have seen this occur three times in the cat. The egg and 13 segmented larva may be found in the cracks of dirty kennels and in undisturbed bedding. On dogs the flea is much commoner than on the cat, but in both animals may do considerable harm when occurring in large numbers. Some animals become almost alive with them, and in such cases the host suffers greatly in general health and condition because the flea sucks blood from its host after puncturing the skin, and the constant irritation thus set up, prevents its host getting rest. The weaker animals are generally most attacked and suffer most, as for instance the nursing bitch and the young puppy, or the dog with disease or injury.

Of the lice, two infest the dog and one the cat. Only one of these, Haematopinus piliferus of the dog, is a blood sucker, the other two, Trichodectes latus and subrostratus living only on epithelial debris. The condition is known as Phthiriasis or lousiness. The Haematopinus is chiefly found on sporting dogs (spaniels) on the ears, lips, throat, and shoulders, but it is also commonly found on all other dogs, the Pekinese probably being the commonest sufferer amongst pet dogs. The Haematopinus is easily seen, brown or grey or purple, attached to the skin from which it is fairly easily detached by traction. The eggs are also seen attached to the hairs. The Trichodectes are smaller and yellowish in colour and are not so easily seen. Lice cause a considerable amount of irritation which is followed by scratching and the formation of scurf, and in delicate skinned dogs often by eczema. The lice (and fleas) may be the means of infesting the host with tapeworms. Many remedies have been brought forward for the destruction of fleas and lice, not all of which are useful. Insect powder is practically useless. The coal tar products are often of great service, but if used strong enough to kill the insects are often dangerous to the host, especially the cat. They should be used well diluted and frequently; paraffin and vegetable oil or water, in the proportion of 1-10, is the most certain, and has the advantage of killing the eggs or nits. Pure paraffin should not be used as it may cause grave symtoms and may lead to at least loss of hair, if it does not blister the skin.

Other parasites are the Tick (Ixodes ricinus) or wood mite and the Harvest bug (Trombidium holoserisceum). Both may be removed or killed by the application of petroleum or petrol. If the harvest bug is beneath the skin, as it frequently is, inunction of Beta-naphthol ointment, or Turpentine is recommended.

By far the most important of the parasitic diseases is Mange or Scabies, caused by the presence of the Acarus Sarcoptes Scabei in the skin. The disease is probably less frequent nowadays than formerly, owing, no doubt, to the greater care which people expend on their animals. On the other hand, I think that the disease is much commoner than we are led to believe, and that very many cases of so called recurrent eczema are nothing but scabies. To a certain number of people—professional men as well as laymen—all cases of skin disease which they do not recognise as mange are eczema, and it is fortunate for them that so many remedies which are useful in the one disease are efficacious in the other. Moreover, many practioners hesitate to suggest to their clients (especially such clients as breeders) that they have mange in their kennels, and fearing unpleasantness, call the disease, of the diagnosis of which they are not certain, by the more popular name of eczema, just as similar men prefer to call distemper by the more popular name of Influenza. It must be admitted however that it is not always easy to distinguish between mange and eczema, the two diseases may be concurrent, or one may follow closely on the other.

Mr. A. J. Sewell has kindly furnished me with the following statistics.

Skin Diseases.

Dogs brought to the office Oct. 1st to Dec. 31st, 1907 :—

		Per cent.
Sarcoptic Mange	32	27.6
Follicular „	5	4.3
Ringworm	15	13.0
Eczema	64	55.1
		100.0

Dogs treated in hospital. 12 months, 1907 :—

Sarcoptic Mange	57	23.2
Follicular „	9	3.7
Ringworm	13	5.3
Eczema	166	67.8
		100.0

Mange is found in dogs of all breeds, and is perhaps commoner in the young mature dog or the whelp than in the old dog, whereas eczema is commoner in the later half of life, which probably explains the discrepancy in the two tables.

It is of the greatest importance to be able to recognise the symptoms of mange if it is to be successfully treated.

We shall not readily find a sarcopt on the surface of the skin, especially if the dog has been treated with any good dressing or if he has been washed. The skin in a typical case shows a red patch, this patch is not evenly red but shows small wheals or red raised lines, sometimes bounded at each end by a papule or spot like a flea bite, sometimes by a papule and a vesicle. This is the burrow of the female, and is in the epidermis, and from it the acarus may be extracted. Generally when a case comes under one's notice, the patch has been scratched by the dog and the surface excoriated, and may be covered with small reddish brown scabs, or if the disease has been in existence for some time, the skin is thickened and in folds, patches are confluent, and the part exudes a foul odour ; there is great desquamation and loss of hair and there is intense itching which increases when the animal is brought into a warm place.

The diagnosis should not be difficult if the disease is well established. It is certain if the parasite can be found but this is not always easy. Without finding the parasite however, a

Note :—Mr. Sewell does not take puppies in at his hospital. The first table is for dogs of all ages ; the second for those of one year and upwards. My own experience entirely agrees with that of Mr. Sewell.

diagnosis may be arrived at from the symptoms which are present. The disease with which it is almost always confused is Eczema but from this it may be differentiated by the continuous itching which increases with warmth, by its rapid spread over all parts of the body if not treated, by the characteristic raised lines and spots in the early stages, by the foul smell and scabs in the later stages, and by the localities on the body from which it starts and spreads.

Thus it is most commonly found at first on the ears, eyelids, the cheeks, the breast, thighs and hocks, inside the elbows, and on the throat. Moreover, it is highly contagious, especially to dogs living in large kennels, whereas eczema is not. Mange rapidly yields to proper treatment, but eczema is often difficult and sometimes impossible to cure. Mange also tends to become generalised, while eczema is more often a local disease.

The treatment is simple, and may consist of regular applications of any reliable parasiticide, due care being taken to choose such a remedy which will not poison the patient, and when such remedy is selected to apply it in such a way as to reach the female and younger parasites beneath the surface of the epidermis. A large number of drugs and preparations have been put into the hands of the public and there is always a ready sale for them. The most common perhaps are the various tar preparations, and I have repeatedly seen permanent blemishes left by the use of these either too strong or too frequently. Sulphur if properly applied is a specific and in my hands has never failed. It may well be combined with Icthyol (which greatly helps to relieve the intense itching) with oil or unguentum lani as a vehicle. Three or four applications at intervals should result in a cure in less than a fortnight. Whale oil, Train oil, and such like disgusting remedies should be avoided. A useful remedy, if applied with care, is petrol. It causes less scurfing and desquamation than sulphur and is preferred by many who have used it with success.

Follicular or Black Mange, is a very fatal disease, especially among puppies and young dogs. It is often incurable and is undoubtedly contagious, though I have never been able to transmit it experimentally to a healthy dog. How dogs originally become infected I do not know and have not yet found a satisfactory explanation. The disease is caused by, or associated with, the presence of the Demodex folliculorum in the sebaceous glands and hair follicles. The acarus is said to be present in the face skin of the majority of human beings, and gives rise to no symptoms except perhaps Acne vulgaris. In the dog it is found to be present in two quite different conditions of the skin, and if it is the definite cause of these, it is difficult to understand why its presence should give rise to such different symptoms in similar animals, especially when it is known to be almost impossible to transmit the disease experimentally. It is almost a rare occurrence to meet with the disease in an old dog, but among puppies and young dogs it is fairly common though perhaps not so frequently seen in this country as on the continent. Two distinct forms are recognised—the Pustular and the Dry or Squamous. The disease is generally first seen on the face and especially round the eyelid as a more or less circular patch partly denuded of hair ; it varies in size and colour, but the skin is generally darker than the healthy skin, and in coloured dogs may even be black. The patch at this stage has somewhat the appearance of ringworm, the skin being a little thickened and the disease very slowly spreading outwards, the hair meanwhile being shed. Similar patches may be seen as primary areas on other parts of the body, when the disease is difficult to diagnose. There is no irritation, but there is a marked desquamation of epithelium which may be branny or come away in moderately sized scales and give the patch the appearance of Psoriasis. The disease may continue in this manner for several months, the patches sometimes appearing to heal and the hair to grow, only however to be followed by a fresh appearance. If the scales be carefully removed and the skin closely examined small red pimples may be seen, and often shot like bodies felt in its substance. These are swollen follicles and sebaceous glands, and if the contents are carefully squeezed out and microscopically examined, the Demodex may be demonstrated. In the other—the pustular—form the disease runs a more rapid course and the appearance is somewhat different. The primary patch appears as in the dry form on the face or head, but its surface carries well marked red pimples which gradually become vesicles and pustules. These rupture, and the purulent material which is discharged dries on the surrounding skin to form unhealthy and foul scabs. Irritation is slight or absent and the dog as yet does not appear to suffer in health. In a week or ten days, fresh patches are found on the inside of the forelegs where these come in contact with the face when the dog is lying down, and also on the thighs and stifle joints and sides of the flank which comes in contact with the face when the dog curls up to sleep. From these places patches gradually extend all over the body. If in the early stage the dog is washed, or groomed, or rubbed all over with some dressing, which is the common practice, the disease almost at once becomes generalised. The dog now possesses a disgusting appearance, the skin is thickened and thrown into folds between which are cracks and fissures which exude an offensive moisture, and over all the body and legs and even between the toes are innumerable pustules in all stages. The hair is almost entirely shed and there is great loss of body heat. Appetite fails and the animal gradually wastes away, dying at last of exhaustion. The course of this form of the disease is about three months, but depends on the vitality of the dog and how soon the patches become generalised.

Probably nearly every drug in the pharmacopoeia has at one time or another been tried against this disease. Some have been favourably spoken of but none has been found to be specific. I have seen tincture of Iodine give good results when well painted on the primary patches, but I have never seen good results follow the use of the coal tar products nor sulphur. Temporary benefit has followed the use of sulphurated potash if used in strong solution. The hypodermic injection of carbolic acid is well spoken of, but I have no experience of it. Most of the methods of treatment take very long to effect a cure, which moreover is never certain, and owners generally prefer to have their animals destroyed. My own method at one time, was to clean the skin where the primary patch is and keep it soaked with rectified spirit, removing the tops of mature pustules and finally drying with absolute alcohol. At the same time, I have infiltrated the surrounding skin with a 1 % solution of Acid Hydrochloride of Quinine with the idea of preventing the disease spreading. A cure resulted in each of three cases but only after about 6 weeks. I now use a form of treatment which has always proved effective and generally in from 3 to 6 weeks. I have ceased to fear the disease becoming generalised, as it seems almost impossible to prevent it, and it is easier to dress the animal all over than to search him for isolated patches and treat these so carefully as not to infect surrounding skin. Probably my method hastens the generalised condition. In the first place I clip the dog very close all over, then wash him with soap and hot water, using a nail brush to aid in removing scurf and the tops of pustules and pimples. Then saturate the skin with Zinc Chloride solution of any strength from 1-10 to 1-100 depending on the amount of pain it causes. This solution is used daily or twice daily, and is the only treatment I have found to act safely and surely. It has been used successfully by Mr. Almond who reported a case before the Central V.M.S. At that time I had already cured two cases by its use. The solution deeply cauterises the pimples and pustules (where their points have been ruptured) but has no action on the unbroken skin. Each of my cases except one has eventually resulted in the growth of a fine coat and no recurrence of the disease.

ECZEMA.

This term is used to signify a catarrhal dermatitis. During the process serum is exuded on to the surface or into one or more of the layers of the skin. It is generally a more or less superficial dermatitis, but exudation always takes place, the exudate has special characteristics and the disease is always accompanied by irritation. It may result from various causes and may be considered a skin re-action to certain stimuli, some of which are known but many of which still remain undecided and obscure. A dermatitis may result from the action of any irritant upon the skin such as will cause an inflammation of some of its layers and undoubtedly this inflammation might appear at first to be an eczema. Such a disease however remains localised, corresponds to the amount of irritant to which it is subjected, and ceases to increase and tends to heal as soon as the irritant is removed. On the other hand in true Eczema the inflammatory reaction is out of all proportion to the strength of the irritant (whatever we may believe that irritant to be) and after this latter has been removed the disease stills tends to run a protracted course and may even continue indefinitely. There is a tendency in some dog's skins to break out into Eczema on the slightest provocation, whilst the skins of many others show no such tendency. Why there is this widely different vulnerability of the skin is not satisfactorily known. But that to a certain extent this vulnerability may be inherited has been proved repeatedly.

Eczema being an inflammation of the skin which is very common, intractable, and recurrent, it may easily be understood that nearly every form of inflammation of the skin, has been given the name of Eczema, and every undiagnosed skin disease in the dog is classified under this heading. As most if not all skin diseases are of an inflammatory nature, some clinicians prefer to call them all Eczemas, and are not always particular to exclude from such a classification specific diseases such as mange and ringworm. Others go to the other extreme and endeavour to find in the dog all the many diseases which have been described by writers on human dermatology. It is very doubtful if the dog is subject to such a variety, and probably a middle course would be best, for Eczema is protean in its symptoms and simulates many other skin diseases. Typical Eczema running its characteristic course and passing through its regular stages is not so often seen. The disease is most commonly noticed in the Spring and Autumn seasons, and in long-coated or wire-haired dogs. This is probably partly accounted for by the changes in temperature, but more probably by the fact that at these seasons the coat is shed and the skin is normally in a more irritable condition. Injudicious diet at this season readily brings on an attack, and dogs with indigestion (hyperacidity) nearly always show Eczema to some extent. I believe that one of the main cause of an Eczematous diathesis is improper feeding; for dogs, though carnivorous, have for generations been forced to adapt their digestive apparatus to a diet of biscuit or vegetables—especially potato. Many people still firmly believe that it is bad to give a dog meat. Potato is a fruitful cause both of indigestion and of Eczema, and biscuit is not to be recommended. It is worth noting that the majority of dogs which have been fed on potato and suffer from Eczema, are easily and rapidly cured when kept entirely on meat after the bowel has been well cleared out with oil or purgative medicine. Acute Eczema is seen in two forms, Erythematous and Vesicular, the latter often being called impetiginous, or perhaps even impetigo. The difference between the two forms is only one of degree, the latter, of course, being the more severe; it is generally also more localised, but tends to spread more quickly. True Vesicular Eczema begins with erythema and the formation of papules and vesicles which rupture, the contents drying and forming a scab, but owing to the dirt and dust in a dog's skin the serum poured out nearly always becomes the cultivating medium for pyogenic organisms. Pus forms under the scabs, causing intense irritation, rubbing, and the consequent enlargement of the affected area. The border of this area is not sharply defined, but is surrounded by a hyperaemic zone which readily lends itself to the extending process. The parts most commonly affected are the back of the neck, the shoulders, and the root of the tail. In impetigo pustules are found and pus is present from the beginning. The area affected is sharply defined, the irritation is less and the tendency to spread is not so marked. Moreover, the disease often calls for no special treatment except cleanliness and antisepsis. Also in Impetigo the skin left after the scab is shed is nearly always darker than that surrounding it, whilst that in Eczema is much paler and more delicate. Vesicular Eczema is non-contagious, but there is little doubt that Impetigo in the dog, like Impetigo in human patients, is contagious.

Acute Erythematous Eczema shows various degrees of severity, and in this form is easily mistaken for mange. The symptoms shown depend greatly on the *depth* as well as the area of skin involved. If the disease be very mild and transient, but deeply seated, there is discolouration of the skin, and particularly of the hair, which takes on a brownish stain, which remains for a fortnight or more. Desquamation is not well marked and irritation is almost absent. The disease is best seen in white or light coloured dogs, and is generally given the name of Rouge or Red Mange. It calls for no treatment save cleanliness. A more severe form is often seen on the sides and back, round the eyes and inside the ear flaps, also round the anus and the corners of the mouth. This variety is often mistaken for mange, but it does not spread rapidly, its situations are not those commonly seen in scabies, it is often most troublesome and rebellious to treatment, and frequently runs a chronic course, not invading the whole body simultaneously as mange will do, but continually reappearing in small areas which have previously been affected. It is greatly influenced by the condition of the patient's digestion and is one of the commonest diseases seen in the dog. When healing the patches show much scurfing, particularly if the disease has been severe and skin stimulants have been used as dressings. At this stage the disease has been named and mistaken for Psoriasis. In Psoriasis, however, the patches spread and the scale is shining and silvery, and on being removed leaves a raised inflamed papule with a well defined border, and covered with no moisture, though very liable to bleed on slight touching. The hair is very little shed. In Eczema the scurfing is either in small flakes or in crusts, which, if removed, leave a moist surface or a clean skin, there is no raised border, the hair more often than not has been shed, partly owing to the great irritation. This form of Eczema is a frequent sequel to mange, especially in delicate skinned dogs; it is then one of the most difficult diseases to treat successfully, and sometimes no treatment seems to have any power of affecting a permanent cure. In a few cases where treatment has been useless, the disease has disappeared spontaneously after some months. On the internal surface of the ear flap this form of Eczema is particularly seen as a sequel to the presence of the Symbiotes Auricularum, and gives rise to a condition which is generally considered a disease of itself, namely, Canker. In my experience, and in that of others, nearly all cases of Canker are caused by Acari, which can almost invariably be demonstrated in the early stages. (The name "*Internal Canker*" for this affection is a misnomer, and should only be used in describing Otitis Media or Otitis Interna). This Eczema of the ear is, like that following mange, very difficult to cure, and owing to the conformation of the ear, readily tends towards suppuration. When suppuration has occurred, it is extremely rare to find any parasite, the skin no longer being a suitable nidus for their growth. Ulceration and cartilaginous excrescences often follow, owing to the continual movement of the parts and the cartilages being exposed and granulating. Eczema may ocur on either surface of the ear flap, quite independent of any parasite, but I would point out that the Eczema of the inside of the ear is almost invariably of parasitic origin. Other troublesome situations for this kind of Eczema are round the nostrils, the eyelid, between the toes, and on the scrotum. Of these the first generally follows on distemper or coryza, or the administration of iodine, or iodides in excessive doses. The second generally follows scabies of the same locality, while that between the toes often takes on a seborrhœic form, and may lead to Onychia, and even shedding of the claws. It is generally associated with the condition commonly known in hunt kennels as "sweaty-feet."

Chronic Eczema is generally seen as a sequel to the more acute varieties, and is more difficult to contend with. It is characterised by thickening of the skin, desquamation, and loss of hair. The irritation is not so severe, but is always more or less in evidence, and if the patient is allowed to indulge in rubbing or scratching, the disease may once more rapidly assume the acute form. The surface may be dry or scurfy, or may be moist, sore and sticky. In the latter case the skin is often thrown into folds and resembles the condition seen in mange and follicular mange. Chronic Eczema is especially the disease of the old dog, and is never seen in puppies and seldom in young adults. This fact helps to distinguish it from contagious diseases. The most common situation is along the back and at the root of the tail, but it may be seen on any part of the body—the moist variety being frequently seen on the flanks and belly.

Dry Chronic Eczema is particularly associated with kidney disease, cirrhosis of the liver and ascites, and is also seen particularly on dogs with profuse undercoats or fur. In these cases the fur is often entirely shed, leaving only a few of the stiffer hairs of the outer coat remaining. This is commonly seen in such breeds as the Chow and other foreign dogs. In some forms of Chronic Eczema where the skin is covered with dry scurf, the condition has been named Pityriasis. I believe this to be a misnomer. The disease most resembling the Pityriasis of man is, to my mind, Seborrhoea Sicca, to be presently described.

The treatment of Eczema calls for much patience and perseverance, and often the use of a variety of dressings. There is no specific, though most success follows the use of ointments, while of drugs sulphur, coal tar preparations, and mercury in some form, are most commonly used with success. In dealing with the acute form, the first principle of treatment, in my opinion, is to allay irritation and so prevent the patient extending the affected area. The chronic form calls for more care, for *gentle* stimulation must be combined with sedatives. If sedatives are not used many cases only become aggravated by treatment. For the vesicular form it is well to clip the hair round the spot, but with care this may be omitted if the place can be kept scrupulously clean. I use hydrogen peroxide in such cases to thoroughly cleanse the part, afterwards smearing over it some protective sedative dressing such as lead lotion and olive oil with perhaps a little oil of wintergreen. This is always effective. Suppuration does not occur often, and if it does it is readily checked. Dry dressings are used by many, but a great objection to their use is the hard scab they form, which cracks or is prematurely removed by scratching. Of all dressings, ointments are by far the most reliable, and my preference is for those with a lanoline basis. No dressing is of great value unless the scratching and rubbing can be controlled, and this may be effected by mechanical means, such as various shaped collars, hobbles, etc., or by the use of opiates, chloretone, bromides, or cannabis indica. Of these, the opiates are least satisfactory, and most dangerous in inexperienced hands. External treatment is aided by the internal and alternative use of drugs aiding digestion ; a dose of oil, followed by stomachics, such as aloes, rhubarb and soda.

In the chronic disease icthyol, sulphur and lanoline have proved a most satisfactory dressing. Resorin, cyllin, and lysol are all very useful, but should be used frequently and very freely diluted, or they will aggravate matters. Ointments are not always successful in chronic cases, particularly in foreign dogs, and those which normally carry a profuse undercoat of fur. In these cases glycerine is a useful medium for carrying applications. Some chronic cases do well when treated with mercurials, such as black wash, mild mercurial ointment, or the green iodide used well diluted, or oxide of zinc ointment. Care must be taken to avoid toxic effects.

Impetigo is a disease of the skin characterised by isolated pustular eruptions, and not connected with any specific exanthematous rash. It is common in long silky-haired dogs. Small groups of pustules appear at the affected part (generally the back of the neck or side of the face below the ear, or top of the head), either coalesce or rupture, leaving a raw surface covered with pus, with a sharply defined border and not surrounded by any hyperaemic zone, except in those parts which have been rubbed or scratched. The pus soon dries, forming brownish scabs which are very adherent, and when removed leave a raw bleeding surface exuding a sero-purulent fluid. The scabs differ from those of purulent Eczema in that those of the latter disease are underrun with pus of a greenish or yellowish colour.

Impetigo generally disappears under simple treatment with antiseptics and protectives such as carbolic oil or chinosol ointment, but fresh patches may continually break out in other parts of the body, only spreading when bitten or scratched. Each patch takes about a fortnight to heal. In one case the disease continued in spite of carefully applied dressings, which appeared to have no permanent effect for over six months.

Seborrhoea is an inflammatory condition of the skin in which there is hypersecretion of oily matter and also of sweat. In dogs it is often seen as the sequel of severe illnesses and as the precursor of Eczema, from which it cannot always be distinguished. The dry form, Seborrhoea Sicca is more often noticed on the body, while the moist form is often seen between the toes. Seborrhoea is characterised by raised patches of crust consisting of epithelial scales glued together by greasy sebaceous matter. These crusts do not form rings as seen in the human subject, but the skin below them is hyperaemic (probably from the presence of micro-organisms), or under old crusts more or less pigmented. Accompanying the formation of seborrhoeic patches, there is a general scurfy condition of the skin, which feels greasy, is dirty, and often emits an unpleasant odour. The disease is particularly well seen after distemper, and in bitches after rearing a big litter, and in very young puppies. It has been called Psoriasis by some, Pityriasis by others, but it undoubtedly arises from disorder of the glandular structures in the skin and has little in common with either of those diseases except occasionally in its appearance. The best method of treating Seborrhoea is to wash the skin well in warm water containing about a tablespoonful of borax to the gallon till the crusts and scurf are removed and then to soak the skin with mild sulphur lotion or milk of sulphur in almond or olive oil; this treatment is successful in about a fortnight or less. Mineral tonics should be given internally.

Psoriasis is a disease sometimes very difficult to distinguish from Seborrhoea. It occurs in dogs and cats as one or more raised patches of skin, covered with silvery scales, which are not easily picked off, but when removed leave a small red (generally bleeding) point beneath them. The border of the patch is raised and hyperaemic and the patches tend to spread, sometimes, but not often, forming rings and wavy lines over various parts of the body. I have seen it most frequently in cats between the shoulder blades extending to the poll; also round the back of the elbows and hocks. There is great hypertrophy of the horny layer of the skin, with atrophy of the skin glands and blocking of the hair follicles with horny debris. The disease occurs on well nourished animals, and seems to cause little trouble. It lasts an indefinite time, but sometimes disappears spontaneously. The hair grows generally of a darker colour over the bare places when these are quite healed, and on one or two occasions warts have grown within a month or two on these areas. I have treated the cases which came under my care with soap and water or warm oil to remove the scales, afterwards applying nitrate of silver to the papules every two or three days and also administering Fowler's solution of arsenic internally.

Pemphigus is a rare disease in the dog. Mr. Gray has seen it in smooth-coated dogs on the under surface of the abdomen as a pendulous bladder-form eruption, in size from a pea to a grape. The bladders are isolated, not confluent, and contain a citron-coloured serous fluid. Constitutional symptoms are marked, and there is great depression. The disease generally terminates fatally. The eruption resembles a scald, or that of an artificial blister.

Comedones and Acne pimples are frequently seen on dogs. On white dogs they often appear as "black heads," and sometimes simulate the appearance of follicular mange. They arise from plugging of the hair follicles with horny debris and sebaceous secretion. This condition is most frequently seen on the nose, especially in those dogs which are compelled to wear leather muzzles. If active inflammation ensues from the presence of staphylococci the perifollicular tissue becomes indurated and painful. Pus if formed finds no exit at the point of the pimple, and the whole follicle may become necrotic. The contents of the comedone are invariably of a waxy consistency, and if squeezed or pressed out assume the form of a grub. Large comedones are found on the neck, shoulders, and backs of long-haired dogs, especially collies and spaniels, and sometimes attain the size of a pea. They are very painful to the touch, and when evacuated leave a well-marked scar. When on the nose they should be soaked and softened with hot water and the contents pressed out. On the back, lancing often assists matters. No after treatment is required, but re-appearance may be prevented by frequent washing with soap and warm water and good grooming.

In Furuncle a similar inflammatory condition is seen, but is much more severe than in simple acne. The folliculitis is suppurative owing to the presence of staphylococci, and there is inflammatory infiltration into the cutis. The pustules may run into one another, forming a large abscess, or epidermis may become under-run with pus which breaks out on the surface at many small points, the skin round the openings often being gangrenous. The process rapidly extends, the part becoming thickened, the hair lost, and the skin discoloured to a bluish tinge. On the face the pus may burrow some distance laterally beneath the cutis, the latter becoming gangrenous and sloughing away. This seldom happens on the body where the condition has more the appearance of a malignant new growth. Constitutional symptoms are well-marked, and in very severe cases death ensues from septic absorption or exhaustion. In small localised patches on the body a free excision of the affected part is the quickest and most certain remedy. In other cases pus may be squeezed out and abscess foci obliterated by strong antiseptics, such as hydrogen peroxide or caustics, and staphylococcus serum may be injected. Stimulants should be given internally in bad cases. I have never seen good result from the use of poultices in these cases, and believe that they encourage rather than abate the disease. About two per cent. of dogs treated by me have been the subjects of Acne or Furunculosis.

Erythema and Urticaria.—These two diseases may be conveniently classed together. Both are apparently of nervous origin, their presence depending upon interference with the vaso motor nerves, which in turn is probably due to derangements of the digestive system. Erythema or simple red rash is a hyperaemia of the skin, not truly inflammatory. It is sometimes seen in puppies during the teething period and in older dogs in the spring or early summer. If it continue for more than a day or two, there is often slight exudation with consequent scaling of the epidermis. Slight pruritus is present in most cases. In Urticaria, or nettle-rash, the process extends further and wheals or nodes are formed, sometimes over the whole body, causing the hair to stand erect. In contrast to the disease in man, itching is practically absent. In Urticaria the exudation takes place only round the blood vessels and does not usually extend into the epidermis. The disease is transient, and calls for no special treatment, but both it and Erythema may be benefitted by the administration of salines and alkalis, and if worms are known to be present, their expulsion is advisable in order to prevent reflex irritation from the bowel.

Pruritus is the name given to a condition frequently seen in the dog, characterised by persistent itching either of some single spot or of the whole skin, but with no other symptom. It is undoubtedly of nervous origin and probably is a reflex evidence of a disordered digestion. The skin reflexes of the dog are numerous and complex. I have one patient which suffers from pulmonary Emphysema ; if the skin over the 9th rib on the left side is irritated he will always cough, and I have noticed that when his cough is at its worst and the breathing most laboured, then it is that his skin is most irritable and the coat in bad condition. The condition of skin irritability without evident cause and without skin lesion is very interesting, and I ask for the opinions of others upon it.

Ecthyma is the name given to a condition of the skin characterised by the formation of isolated pustules on hard raised bases and surrounded by an areola of inflammation. They cause intense itching at times and frequently precede Eczema which is induced by continual scratching and licking The pustules soon rupture, forming a hard dry scab which in the course of a fortnight generally falls leaving a clean skin with a small scar, the part being denuded of hair. Their occurrence must be accounted for by the presence of pyogenic organisms, but the exact nature of the affection I am unable to explain. The disease differs from Impetigo in that the pustules are discrete and not grouped into patches; they extend all over the body and are commonest on the back and the backs of the thighs. They differ from the exanthem of distemper, being more raised, slower in maturing and passing away, and having hard inflamed bases. They do not coalesce and are not commonly found on the belly and they cause intense itching. The disease is common in the castrated male cat and seems to be caused in his case by some change in tissue metabolism brought about by the operation. I have never seen the disease in females, either normal or spayed, except cats which have never had kittens nor come on heat, and never in the male dog, though I believe it has been seen in spayed bitches. Little can be done to cure the disease, but some success may be attained by the use of sulphur and oil temporarily and also by the use of carefully chosen antiseptics mixed with glycerine. I have not found that diet has any influence on the disease.

Interdigital Abscess is a very common condition though some writers describe it as rare. It may arise from (*a*) the presence of a foreign body or (*b*) inflammation following blocking of one of the sebaceous glands which abound in this situation, the irritation being kept up by the presence of granulomatous tissue. The latter form is closely associated with moist seborrhoea. The symptoms are the rapid appearance of a swelling between any two toes causing pain and severe lameness. This is *not* a cyst as described by most writers on the subject. By constant licking the surface skin of the abscess is soon broken and the place heals after the contents have been discharged, only to reappear at some future time. At each recurrence the part becomes more thickened from inflammatory changes, till at last the toes may become widely separated. In some cases the gland becomes gangrenous, or may be the seat of new growths of a granulomatous nature. The only treatment of any real use is total extirpation of the offending part; this may be effected by incising an eliptical piece of skin over the tumour parallel with the toes and thoroughly curetting away or burning with the thermo-cautery.

As to the abscess or fistula caused by foreign bodies, it is similar to the last described condition, but on operating no granuloma is found but the foreign body is generally to be reached by passing a forceps some distance through the external wound up between the toes and searching for it. In this district the offending body is almost invariably a dry head of barley grass which is very common here. I have removed 28 of these during the last 3 years. In all cases it is advisable to leave the operation wound open so that it may granulate from the bottom and so obliterate the part which formerly was subject to disease.

A condition somewhat frequently seen, is to be found in almost any part of the body and is termed Milium. A small hard body like a millet seed is to be felt in the substance of the skin, but causes no inconvenience and calls for no interference. It is due to the retention of secretion in a sebaceous gland which has become encysted. It is most commonly found on the face, eyelids, and the ear flap.

Sebaceous Cysts are fairly frequently met with and result from temporary blocking of the duct of a sebaceous gland. The plug soon gives way from internal pressure, and the secretion is poured out round the mouth of the hair follicle where it rapidly dries, forming a brownish crust. These crusts which also contain skin debris and dirt sometimes increase in size rapidly and form "cutaneous horns." They may be found on any part of the body but have been seen most on the sides of the face and corners of the mouth.

Closely associated with these cysts are sebaceous warts which are seen in old dogs. They probably arise from continued irritation of the sebaceous glands. They are covered with a brownish waxy crust, which after removal is seen to have covered a pinkish reticulated surface, consisting of the hypertrophied stratum corneum and stratum malpighii. They cause some itching, and are often seen along the line of the back. The best treatment is extirpation by the knife or actual cautery.

The Pustular Exanthematous rash of distemper is quite distinctive, and deserves much wider recognition than is at present accorded to it in this country. I look upon it as a crying disgrace to our profession that this striking symptom of distemper is persistently ignored by Veterinary Surgeons both at shows and in their own Kennels, who thus by either their ignorance or by wilful neglect allow the spread of this scourge of the canine race. Dogs with the rash of distemper upon them should no more be allowed on the show bench or among other dogs, than children should be allowed to go to school with the rash of measles or scarlet fever upon them. Of all the skin lesions which we see in practice this is the one most frequently wrongly named and wrongly diagnosed. On innumerable occasions I have heard it named "Teething Rash" even in a puppy three months' old, and even in our teaching schools it has been repeatedly pointed out to students as one of the symptoms of the presence of worms, and many a poor puppy has been killed through wrong treatment. The popular name given to the rash is "Puppy Eczema," though the rash does not resemble Eczema except to those who will not take the trouble to endeavour to diagnose their cases.

The pustule developes rapidly in four or five hours and has the appearance of a small rounded pink or red papule varying in size from that of a pin's head to that of a split pea. In another two or three hours the papule becomes translucent at its summit, and contains a thin clear fluid which rapidly becomes turbid and creamy. The swelling is now a conical pustule with often an irregular outline and with hyperaemic borders, sometimes circular, sometimes more or less oval, and sometimes attaining the size of a horse bean. In about six hours after maturity they rupture, the contents drying into a brownish scaly scab. If this is removed a pit-like depression is left, and if the pustule has been large a well marked scar is left. The pustules may be discrete or confluent, there may be one, or there may be hundreds; they are most frequently found on the belly and thighs (hairless parts) and inside the ear flap, but there may be a generalised eruption over the whole body. In the early stages often only a few are seen and may be easily overlooked as the eruption is evanescent, the pustules forming and drying in the course of twenty-four hours. During the course of the disease lasting from five to eight weeks, a secondary and even tertiary rash may be noticed.

The treatment of this rash is of course the treatment of distemper itself, but as far as local treatment is concerned it is best to encourage rather than suppress the formation of pustules, and with this object in view the skin should be kept warm by flannel clothing or rugs and the patient not subjected to sudden changes of temperature. If the skin becomes moist from the rupture of many vesicles, it may be bathed with warm water and Sanitas, and afterwards dried and dusted over with oxide of zinc. When the rash has been rapidly suppressed or the skin irritated by strong dressings it sometimes happens that subcutaneous abscesses form, and after rupture or lancing show little or no disposition to heal. The edges of the wound ulcerate and cause great trouble to the attendant, at the same time endangering the life of the patient unless he is a strong young dog.

That this pustular eruption is pathognomic of distemper I am quite sure, and I have only failed to find it twice in the last 120 cases I have had under my care.

Without going into details of the external manifestations of Tuberculosis, it is worth recording the numerous cases of ulcers and sinuous wounds in the cat, particularly in the regions of the neck and limbs, the discharge from which so frequently contains large numbers of tubercle bacilli. I have found that wounds on cats' legs which show no tendency to heal and which discharge a greyish thin fluid pus are nearly always tubercular. If by unremitting attention the place does heal, an abscess nearly always forms at some point nearer the body than the original sore, and the trouble commences afresh. Such cats should be destroyed for their own sakes as well as for the safety of other animals and human beings.

DISEASES OF THE NAILS AND PADS.

The only diseases which call for special mention are Onychia, or inflammation of the nail matrix, broken or in-growing nails, and hypertrophy of the horny covering of the pads. Inflammation of the nail matrix is common, and often associated with interdigital eczema. It generally disappears under the usual treatment for acute eczema, but occasionally suppuration occurs and the nail is shed. Broken nails should always be pulled off with forceps. In-growing nails only require cutting at regular intervals.

In hypertrophy of the horny covering of the pads we have a very peculiar disease almost confined to Irish terriers of above six years of age. I have seen it in Otter hounds and Airedales. The horn grows rapidly and fissures, giving the pad a fringed appearance, and making the foot splayed. Sometimes the horny excrescences are soft, but generally they are hard, like nails, especially when of long standing. In some cases the horn degenerates and the feet have an unpleasant smell, or the horn in places may become broken down to a fine greyish powder. Walking becomes painful, and the dog very lame. The growths may be removed with a knife or with salicylic acid in collodion, but soon recur. The pain is often relieved by keeping the horn soft with inunction of castor oil or lanolin.

DISEASES OF THE HAIR.

Alopecia is sometimes seen in both dogs and cats. Bald patches appear in various parts of the body, but particularly on the top of the head and above the eyes. It is possible that the disease may be a neurosis ; but, it is more probable that it is of microbic origin, as it generally gives way to energetic antiseptic and stimulant treatment.

The most important group of diseases of the hair are undoubtedly the ringworms, particularly on account of the ease with which they may be sometimes transmitted to man. Mr. A. J. Sewell writes to me with regard to this as follows :—

"I should say ringworm is the most important disease (of the dog). I have known whole families to catch the disease from a dog, and it has taken months, in one case eighteen months, to cure."

The dog is the subject of four varieties (1) Trichophyton caninum (2) Microsporon caninum (3) Eidamella spinosa (4) Oospora canina. The first and last are the most important. The Trichophytic ringworm (or Pityriasis versicolor) is generally seen in the form of a suppurative folliculitis on the head and legs, particularly round the lips and eyes. The patches are generally more or less circular, and covered with grey crusts and a few broken hairs. They spread quickly, and if rubbed or scratched may bleed. If the crusts are scraped away the skin beneath them is of a leaden or coppery tint, and shows the enlarged follicles rising above the general surface like small seeds. The condition closely resembles that of follicular mange.

The Oospora canina is the cause of dog favus. It is seen frequently in young puppies, especially those which are still with their mother; but may also be found in adults and old dogs. The head and belly are the seats commonly attacked The patches may be circular, oval, or in lines. They are depressed or cuplike, and the centres at least are sulphur yellow and the crusts emit a most unpleasant odour.

The Microsporon is not so common but is more easily transmitted to man. In each of the diseases the fungus may be found in the patch, and favus is the easier to demonstrate, the crusts in this affection consisting almost entirely of parasitic elements. Trichophyton is not so easily seen, and may invade the follicles and surround the hairs, or even penetrate into the inside the hair itself.

In the cat are found a Trichophyton, a Microsporon, and a favus, probably the Achorion quinckeanum. I believe all are readily transmissible to man. I have often seen cases of favus in the cat, the disease being situated on the middle line of the nose, in the form of a yellow crater-like prominence. In this situation it has appeared to give little trouble and has been easily cured. It also affects the ears and toes, and here it is difficult to deal with, though it may not cause the cat much inconvenience. Ringworm, of both dog and cat, when affecting the feet may also attack the claws and cause these to be shed.

The treatment consists in generally applying strong antiseptics, such as perchloride of mercury or silver nitrate to the affected parts, and following up this with strong stimulants or counter irritants, chrisophanic acid salicylic acid, iodine, and such like drugs. If a cat is badly affected it is best to have the animal destroyed, owing to its roving propensities and to the risk of infecting human beings.

GENERAL PRINCIPLES OF THE TREATMENT OF SKIN DISEASES.

In conclusion, it is desirable to point out that, in treating all skin diseases both of cat and dog, it is always advisable when choosing a remedy to first consider if the animal is very susceptible to its action. This is particularly necessary in the case of the cat, and it applies to the dog also when mineral preparations such as lead and mercury are to be used. If the disease is widespread, only a portion of the skin should be dressed at one time. Absorption takes place readily from the skin, especially if the preparation be rubbed in, or if the epidermis is abraded. I have seen a dog killed by the inunction of sulphur and oil. Poisoning may, and often does take place from licking of the dressing, and this should be carefully guarded against. The application of a dressing, particularly of ointments or thick oils, or the continued moistening of the body by lotions, may cause great loss of body heat with consequent depression or even collapse. Thick oily or greasy applications may cause cutaneous asphyxia. Special care should be taken in cold or wet weather. All skin diseases lower vitality, and a dog affected with them is more susceptible to the effects of heat and cold; the constitution requires building up, and the vital powers stimulating. Good food and plenty of it is generally an essential element in the treatment, only those dogs which have been overfed and are gross, when suffering from recent and acute diseases, being benefited by depletive treatment. But, as so many skin diseases are often associated with, if not caused by indigestion, it is generally advisable to evacute the contents of stomach and bowel and let the patient make a fresh start on a well-chosen and nourishing diet. With regard to medicinal treatment, tonics must always take a first place as regards utility. Quinine, iron and arsenic in small doses are of great service, and also mercury and arsenic in the form of Donovan's solution. For outward local application, well selected ointments are by far the most reliable when properly applied. Let me quote Erasmus Wilson:—"If we look upon an ointment when applied in this way to the skin in its true light, we shall see that it presents conditions and advantages which no other local application possesses, and we cannot but arrive at the conclusion that it is a most valuable remedy and one for which no equally efficient substitute can be found. It is light, produces no pressure, is thin as a film of varnish, and yet excludes the air from the inflamed part, thus preventing dessication and oxydation, and it retains the ordinary moisture of the skin, acting as a water dressing or natural poultice." Oily dressings are almost equally as useful and often preferable when in long-coated dogs the hair has not been removed. They are cleaner and more easily applied. Medicated baths are useful if not used too frequently. Frequent washing is harmful to the dog's skin, and is doubly so when that skin is diseased.

Finally, before any system of treatment, however skillfully selected, can be satisfactory, it is most necessary that a careful diagnosis be made of the condition to be treated. I am repeatedly having dogs brought to me which have been treated for long periods for eczema, and the case often diagnosed as such by Veterinary Surgeons, when the disease has been mange and the parasite identified. Gamgee wrote in 1863:—"Skin diseases are not always difficult to cure in proportion to their length of standing. I make this remark, because it is a common notion amongst dog fanciers, keepers and sportsman, that after a certain time a disease *gets into the blood* and cannot be cured; and this is believed of parasitic affections that are eradicated by one good dresssing." And again:—"The practitioner must distinguish between cause and effect, and this is by no means an easy distinction in some cases. He has to judge whether a special general disturbance is the cause of a skin disease, or whether the latter is the cause of constitutional symptoms. When the nature of the eruption is recognised, it is, as a rule, comparatively easy to determine what relation the general symptoms hold to the local, but it is in the recognition of the nature of this eruption that failure is of everyday occurrence."

Discussion.

Mr. G. H. Livesey: Before the discussion commences, I should like to say that last night Mr. Garnett came to me and told me that he had brought some photographs of the parasites of the dog and cat which he thought the members would like to see, and I am very glad to have this opportunity of thanking him before you all, because it was a very kindly thought on his part. I am sure the photographs will be of great interest to you. (Cheers).

Mr. James Peddie: I feel that my first duty must be to thank you for the honour I have received at your hands by your invitation to open the discussion on the important paper submitted by Mr. Livesey. I use the word "important" advisedly, because I think it will be readily admitted that, within recent years, dog practice has attracted much greater attention than formerly, probably for the twofold reason that the variety and value of dogs are constantly increasing. In these days when motor cars are displacing so many horses, and with them the accounts in the ledgers of veterinary surgeons, I feel sure that many of us are glad to turn our attention to this interesting and profitable line of employment, in order that our incomes at the end of the year may be either maintained or increased. I therefore think that this Association is to be congratulated on bringing such a subject before our notice today. I must say, however, that I feel very deeply that there are many men who have given much greater attention to dog practice than I have who would be more competent to open the discussion; but I will do my best, and I will ask your indulgence while I try to wade through this very varied paper of Mr. Livesey's.

I must, to begin with, congratulate Mr. Livesey on his paper, which I think at least bears the impress of much careful thought and study, but I do think that he has neither done justice to himself, nor has he done justice to the practising veterinary surgeon in his paper. It appeals to me as being very much too general in the first place, and not specific enough for the average practitioner who is largely interested in canine medicine. I thought, when I glanced through the paper first, that I would feel myself today somewhat in the position of the Scotch Divine who was asked to fill a neighbouring pulpit; who preached the forenoon sermon, and who was suddenly asked, quite unexpectedly, to take the afternoon service. He was in a dilemma; he had no sermon, and if he had had a sermon the difficulty that arose to his mind was, that if he had given another one it would have taken away the impression which he thought the special sermon he had already preached had left behind. He mounted the pulpit in the afternoon, and addressed the congregation as follows: "Brethren, since the conclusion of the forenoon service it has been pointed out to me that the sermon which I preached was not sound doctrine. Now I assure you that nothing could be further from the truth, and in order to convince you I propose to preach the same sermon this afternoon." (Laughter). Gentlemen, I am not going to do that; but while I must say that a good deal of what Mr. Livesey has written, so far as it goes, is sound doctrine, there are nevertheless many points on which I find myself in disagreement with the essayist.

The first point that strikes me in connection with the paper is the want of proportion in dealing with the diseases. I think you will all admit that, of the skin diseases that come before canine practitioners, scabies and eczema constitute the bulk. What do we find in that respect in the paper? We find that scabies, sarcoptic and demodex, are treated on four and a half pages, and eczema is similarly dealt with. Other diseases occupy the remainder of the paper, diseases which, in my opinion, are of more doubtful occurrence in the dog, or if they do occur are very seldom seen—and I speak from twenty years experience and have seen a good deal of skin trouble. In this connection I would like to draw your attention to the tables of skin diseases given by Mr. Livesey on page (129) of the paper. Those tables are compiled by Mr. A. J. Sewell, and if you look over those tables you will see there is no reference to any other skin disease of the dog than sarcoptic mange, follicular mange, ringworm, and eczema. I take it that, as the table is headed "Skin diseases," if other skin diseases had come before an observer such as Mr. Sewell they would likewise have been included in the table.

Passing on to deal with sarcoptic mange, I quite agree with the essayist that "mange is found in dogs of all breeds," although it is much more common in the short-haired varieties of dogs. In dealing with mange, I was rather struck with the somewhat unflattering remarks which Mr. Livesey makes in his paper on page (128) and also on page (146), where he says, "I am repeatedly having dogs brought to me which have been treated for long periods for eczema, and the case often diagnosed as such by veterinary surgeons, when the disease has been mange and the parasite identified." That is not very nice, and I should have thought that, in those circumstances Mr. Livesey might have taken the trouble to give some means of helping his erring brethren to make a more sure diagnosis of skin disease. The surest method of diagnosing scabies undoubtedly is the demonstration of the sarcopt, and on the actual methods of demonstrating it Mr. Livesey says nothing. I have so many points to deal with that I need hardly take up your time by giving you the method I adopt, but it is a very simple one. You simply take a scraping of the skin with a curved scissor or a curette, broad shaped, put it under a watch glass, add a 10 per cent. solution of caustic potash, break it down with needles, and examine it under a low power of the microscope. The alkaline solution clears up the preparation very much, and the coverings of the acari stand out very distinctly. There is a method of diagnosis that has been suggested by Harrison, which is probably new to you. He, after cleaning the skin, paints it over with either black ink or Indian ink, and the burrows of the parasite show up very distinctly. He then wipes it off very quickly, and they show up on the black lines. There are other methods which are followed, but I need not trouble you with these things.

Going on to treatment, here again Mr. Livesey is very general, and while I have no fault to find with the acarites which he chooses, still I think he might have given us a little more information as to the methods which he employs when using them. He says nothing about the preparation of the skin. I think it is one of the most important features in dealing with scabies in the dog that the skin should be thoroughly prepared to receive whatever acarite you are using. Another point he omits to mention is, that after each washing of the dog it is absolutely necessary that you should take care to change the litter thoroughly and properly disinfect the kennel. If you do not do that you are apt to have trouble. In dealing with this disease Mr. Livesey says "A useful remedy, if applied with care, is petrol." I should like to ask what he actually means by petrol, whether he means one of the kerosine or one of the petroleum-benzine preparations.

Then I pass on to follicular or black mange. Here I find that Mr. Livesey is a little inconsistent. He begins by telling us that black mange is a very fatal disease, and that it is often incurable; but he finished up by saying "Each of my cases, except one, has eventually resulted in the growth of a fine coat and no recurrence of the disease." I think I am more in agreement with his later remark. Personally I do not regard follicular mange by any means as an incurable disease. I have only treated four cases—one of them was of the squamous type and the other three were of the pustular type. One of my cases was seen and the diagnosis confirmed by my friend Prof. Hobday, and he also saw the dog after it was completely cured. In all my cases I may say the diagnosis was made absolutely certain by the demonstration of the Demodex folliculorum. I am glad to say that all the cases recovered. I am willing to admit, however, that the treatment of follicular mange has been in my hands a very troublesome and prolonged business, but I am hopeful that, with improved methods of treatment, we will in a very short space of time come to regard follicular mange as by no means an incurable disease. There is another point in connection with follicular mange where I disagree with the essayist. He says the appetite fails, and the animal very quickly falls into a marasmic condition. That has not been my experience with the cases I have seen. I have rather been struck, on the contrary, with the manner in which the appetite was maintained. Friedberger in dealing with this disease says, "The appetite of such dogs is remarkably good"; and Dr. Schindelka, in his Hantkrankheifen, 2nd Edition, says, "In no single case of my entirely plentiful material, could I see a cachexia intervene resulting in death." Certainly that has been my experience, and I do think that Mr. Livesey in that matter is wrong. I may say that in treating follicular mange I have recourse to quite a variety of remedies. I use among other things ordinary paraffin, bisulphide of carbon in oil, balsam of Peru in spirit, iodine and chloroform, creosote in oil, and probably I may have combined some of my dressings with tar sulphate and some of these other things. I would like in dealing with this matter to give you the opinions of Dr. Schindelka, who has been extremely successful in dealing with follicular mange. It is generally considered by many veterinary surgeons that follicular mange is really an incurable disease, but I would like to point out to you that Dr. Schindelka makes the following remarks under the heading of prognosis on page 250 of his book: " My experience of sure cases of demodexic scabies which have been cured, and in which on the cessation of the treatment after months of observation no relapses have taken place, extends over far more than 100 cases, a number which might permit of a fairly definite conclusion (*i.e.* as to its being possible to bring about a cure with proper and patient treatment.") Certainly my own experience is exactly similar to that of Dr. Schindelka; I have always been successful, but it is a very troublesome business. Perhaps you would be interested to know the treatment Dr. Schindelka follows in dealing with follicular mange. After carefully freeing the skin from dirt and other secondary efflorescences by means of baths, pads of cotton wool soaked in carbon bisulphide are applied and kept for a few minutes pressed against the diseased parts, and after the parts are quite dry he covers them with a one to three per cent. formalin paste—formalin 1 to 3, vaseline 50, starch and zinc oxide 24 parts. This process is repeated every three or four days. In cases where the skin has become much thickened, he uses bisulphide of carbon combined with sulphur and neutral soap. This is well shaken up and thoroughly rubbed into the diseased skin every few days. With the first method of treatment he says the desired result may be hoped for in many cases after from three to five dressings, with the second method after twice or three times that number. He adds that the first method causes the patients severe and lasting pain, which they show in an active manner, but the second method is more easily borne. He further points out that severe conditions of irritation should always be removed before using the carbon bisulphide. Then he has a second method of dealing with it. After removing the grease from the skin by means of sulphuric ether, or carbon bisulphide, bandages with a 5 per cent. formalin solution are applied, or a 5 per cent. formalin ointment is rubbed in, or formalin in acetone, 2 to 3 per cent., is rubbed directly on the diseased part. Although the number of experiments are too few to permit of a definite decision, he says, " The results of the formalin treatment, especially the last method, are very satisfactory and encourage me to continue it." I should think that last method would be very successful, because acetone is such an excellent fat solvent that it will help the penetration of the formalin into the tissues very deeply and in that way act very well.

I must now pass on to the subject of eczema. Here again the writer has simply dealt with the subject in a very general way. Eczema, as you know, is such a subject that it could quite well form the basis for a paper at this meeting, and leave any amount of room for discussion. The definition which Mr. Livesey gives of eczema is, " This term is used to signify a catarrhal dermatitis." I think if he had added to that " Probably with the resulting skin lesions very varied and depending on the extent and character of the changes in the epithelium," he would have given us a better idea of the exact character of the disease. I need hardly go into the minute changes which take place in the skin, although they are very interesting. They are practically three in number, but I cannot stop to deal with them. They are very well dealt with in Unna's Histopathology of the Skin, and form most interesting reading. One of the most outstanding features of eczema, so far as I have had experience of it, is its polymorphism ; there can be no doubt about that. Going on to page (133), Mr. Livesey says, " There is a tendency in some dogs' skins to break out into eczema on the slightest provocation, whilst the skins of many others show no such tendency. Why there is this widely different vulnerability of the skin is not satisfactorily known. But that to a certain extent this vulnerability may be inherited has been proved repeatedly." There I think I find myself in agreement with the essayist, just as in tubercle in animals we say there is a possibility of a predisposition to the disease being inherited. I think that in dogs so far as eczema is concerned there is a predisposition to the disease, and if we accept that factor as proved it goes a very long way to explain the frequent recidivations of the disease, which we recognise as one of the most troublesome features of eczema. Then Mr. Livesey says : " I believe that one of the main causes of an eczematous diathesis is improper feeding, especially a diet of potato and biscuit." On this point I think I also agree with the essayist. I think I have seen cases where I have felt quite sure that the diet had a great deal to do with the production of the trouble. On the exact etiology of the disease the essayist says nothing. That is really a very interesting point, and I am sure it would have met with your approval if he had gone into the matter. You are all familiar with the various causes of eczema. They are external irritants and pathogenic micro-organisms, Unna's, micrococcus or staphylococcus epidermidis albus. Quite recently some Continental observers, Bockhadt among them, have shown that eczema could be produced at will by the application of staphylotoxin to the skin or by the filtration of bouillon cultures of staphylococcus. The etiology of eczema is a difficult question. Some hold it is parasitic, some hold it is not. Some who follow the parasitic theory maintain that the parasite is the direct cause, while others say that it simply aggravates the condition. We all know that disorders of digestion and assimilation are a very important factor in the production of eczema. Before I leave the subject of eczema, I would like to draw your attention to what is to me a most interesting paper, and I am sure it will be to all of you, namely, a Thesis by Dr. Francois-Dainville, of Paris, on the Disturbance of Nutrition and Urinary Elimination in Diathesic Dermatosis, especially Eczema and Psoriasis. At considerable trouble I waded through this very laborious paper, which nevertheless is one of considerable merit, and there are one or two things in it which I think it would be worth directing your attention to. He says, under the general study of urinary elimination in eczema and psoriasis, that the total nitrogen excretion is below normal in both diseases. The normal excretion is 13 grms. per day, being ·22 grm. per K.; in eczema it is 11·16 grms. per day, ·18 grs. per K.; and in psoriasis 11·81 grms. per day, and ·17 grms. per K. Hence, he says, there is insufficient nitrogenous metabolism. Then he goes on to the inorganic constituents, and in dealing with chlorides he says "NaCL. appears to aid the kidney in its depurating function, and it is found that in both eczema and psoriasis there is an excessive excretion of NaCL. A veritable discharge of chlorides accompanies the greater and more perfect elimination of nitrogenous metabolites, and the rise in toxicity of the urine which occurs at the time when the skin affection is clearing up. This effect is more marked in psoriasis than in eczema. Hence chloride-free dieting is a mistake." Your have often heard that, in human beings at all events, things containing an excessive amount of chloride of sodium were prohibited; but he shows that is a great mistake. His metabolism ratios are exceedingly interesting, but I will only quote the one dealing with the total nitrogen. He says, "This is an index of completeness of organic combustion, and is also a measure of the hepatic function. The normal value is 85 to 88 per cent. In both diseases this ratio is low. It rises as recovery comes on. The fact points to a fault in metabolism (in these diseases) of the nitrogenous material of the body. The abnormal nitrogenous metabolites resulting are the cause of the auto-intoxications of the diseases." Then I think I had better read you the conclusions he arrives at He says, "All the clinical methods used tend to show that in eczema and psoriasis there is: 1. A sluggish and vitiated nutrition. 2. Renal insufficiency. The latter, though generally a consequence of the former, reacts back." "The chlorides of the diet must, then, be kept up, though irritation by excess must also be avoided." The practical conclusions he deduces from his paper are "In addition to local treatment: 1. Look carefully to the alimentary system. 2. Aid the kidney functions by avoiding the absorption of irritating and toxic substances, and by promoting diuresis. It is really a most interesting paper, and worth I am sure the consideration of anyone who is interested in the etiology of eczema. Passing on to page (136), Mr. Livesey says that, " Dry chronic eczema is particularly associated with kidney disease, cirrhosis of the liver and ascites." I have made a good few post-mortems on dogs that have been the subject of chronic eczema, and I can say that I have come across cirrhosis of the liver. Kidney disease I am quite willing to admit is of frequent occurrence. The essayist has dealt with the treatment of eczema in a very general manner also. The treatment of eczema is such a wide subject, and depends so very much upon the phases in which you find the disease, that it is almost impossible to lay down hard and fast rules. Nevertheless I do think that if the subject had been handled by itself, large matter might have been dealt with in this way which would have been very interesting to us as practitioners of canine medicine.

I pass on to deal with some of the other diseases following the chief ones which I have now dealt with, as briefly as possible. I agree with the essayist that impetigo does occur in the dog. I think I have seen quite a large number of examples of what I would say were typical impetigo as it is known in the human subject. I may say that I have had experiences of seeing and observing lesions in the human being which are not given to many members of my profession, and I do know also that impetigo occurs in dogs. The symptoms have been fairly well described by Mr. Livesey. The parts of the body where I have seen it breaking out are the head and the neck, along the back, and very often at the root of the tail. Mr. Livesey has well described the appearance of it, and I will not go further into the matter, while he is also quite happy on the treatment. In dealing with seborrhoea at the bottom of page (137), Mr. Livesey describes it as " An inflammatory condition of the skin in which there is hypersecretion of oily matter and also of sweat." I do uot think that that is a proper definition of seborrhoea. I think it would be more strictly correct to say " Seborrhoea is an inflammatory condition of the skin in which there is hypersecretion of the sebaceous glands." Seborrhoea also occurs I think in the dog; you find it in debilitated dogs following on some of the infective diseases and other conditions. It is not a serious matter, and therefore I do not propose to take up your time discussing it. I do not think that psoriasis occurs in the dog. Pemphigus I have never seen in the dog, and I do not think it occurs in the dog. Comedones and acne occur, as we all know, in the human being, but they are really of no moment to practitioners of canine medicine. With regard to furuncle, I must say I have never seen a case of furunculosis in the dog. We are all quite familiar with the boils which break out in human beings, but I cannot say that I have seen a case of furunculosis in the dog, although there are other members who have a much greater experience than I have had, and they will correct me if I am wrong. With regard to erythema and urticaria, I need hardly trouble with erythema, but with regard to urticaria I have a similar remark to make. I have frequently seen urticaria in horses and cattle, but I have never seen a typical case of urticaria in the dog. Pruritus is more a sympton than a condition, and I do not propose to say anything about it. Ecthyma, as the word signafies, is a pustule, and I look upon it as simply an aggravated condi tion of impetigo. I hardly think that this is a disease either which applies to the dog. My cases of impetigo have all yielded to treatment quite readily, and I have never seen any trouble such as follows in the human subject giving rise to this condition of ecthyma. Interdigital abscess I mean to pass over. I have seen it frequently, but I do not intend to say anything about it. Sebaceous cysts I will pass over in like manner. Mr. Livesey says on page (142), "Closely associated with these cysts are sebaceous warts which are seen in old dogs." I would like to say that I have seen on a good few occasions a condition occurring in old dogs which resembles very much a condition which is seen in the human being called mycosis fungoides, In the condition that occurs in dogs you get little tumours forming on the head and right down the back which are of a pretty red colour reminding me of the tumours one gets on the penis (?) of the dog, of a somewhat mushroom form. I have seen them varying in size from a pea up to a hazel nut, and almost as big as a pigeon's egg in one or two cases. This is not the same condition as occurs in the human being, because I have never observed any of the cachexias and other conditions which are associated with this disease in the human subject. After simply snipping off the growths and treating them with perchloride of iron or nitrate of sulphur, and putting the dog on several doses of Donovan's solution, I have had no trouble. I mention it now because there are other gentlemen present who have had a larger experience who may have seen a similar condition. I pass on to the pustular exanthematous rash of distemper. Here again Mr. Livesey makes a very grave charge against his professional brethren, and I am afraid I must plead guilty, along with others, to having failed to discover this particular rash of distemper. I do not agree with Mr. Livesey that the rash of distemper always follows the course which he has described in the paper. I have seen on several occasions the the nearest approach to pemphigus that I have ever seen in the dog in cases of distemper. I have seen in quite four or six cases of distemper a very distinct pemphigus-like eruption occurring inside the thighs and right down the abdomen as far forward as the chest. Certainly the bullæ were nothing like so large as I have seen in cases in the human subject, but at the same time the eruption was distinctly of a pemhigus nature and did not follow the lines laid down by Mr. Livesey. Mr. Livesey says, "Dogs with the rash of distemper upon them should no more be allowed on the show bench or among other dogs than children should be allowed to go to school with the rash of measles or scarlet fever upon them." The indictment is not quite so severe if one looks into it, because later on Mr. Livesey says that, "The pustule develops rapidly in four or five hours, and has the appearance of a small rounded pink or red papule, varying in size from that of a pin's head to that of a split pea." "In about six hours after maturity they rupture," and then he goes on to say they disappear very quickly. So that it is quite possible a case might be brought under the notice of the veterinary surgeon after the eruptive stage had passed. Diseases of the nails and pads I have not time to deal with. Alopecia I have seen in the dog, I have had one or two vary marked cases. I well remember one case in particular, a dandie bitch, where the alopecia began on the head, and extended over the neck and the whole body, until the skin was absolutely denuded of hair. I was most anxious to have a photograph of the dog as I am making a collection of photographs of skin lesions, but the lady would not allow me to take it. The dog was destroyed, and she would not allow me even to make a photograph. But I do think that alopecia occurs in the dog, and it would have been interesting to have heard more from Mr. Livesey with regard to it.

I am afraid I have already taken up quite enough of your time, but I have merely touched on the fringe of the paper. I hope that what I have said will stimulate others to rise and give us their views on the subject ; and it now only remains for me to thank you for having given me such a very patient hearing. (Cheers).

Mr. William A. DellaGana : I should like to refer to the subject of the hypodermic treatment of follicular mange, which has not been mentioned either by the essayist or by Mr. Peddie. I do not know whether any member has any experience of that method of treatment, but I have successfully injected a 2 per cent. sterilised solution of carbolic acid very carefully into the skin around the eruption about once or twice a week. It is very painful to the patient, and sometimes a little skin bleeding results, which is generally got rid of by dusting it over with a small quantity of boric acid, or tannic acid, or something of that kind. I would like to hear whether any of the gentlemen present have used that method. It was somewhat disputed just now as to whether urticaria occurred in the dog or not. About a year ago I had a very interesting case, of urticaria in a smooth haired dog, in which the blebs were very clearly defined. The dog appeared to have had an awful thrashing with a whip, because the marks upon it were particularly noticeable. The owner of the dog brought him to me in great alarm. There was no history of the dog having been ill, and my diagnosis was urticaria, very much the same as occurs in horses. I administered the usual salines, and twenty-four hours afterwards nothing of the trouble was to be seen, the dog quite recovered. That convinced me that I had a case of ordinary urticaria to deal with.

Mr. E. H. Stent : I thank Mr. Livesey for bringing this paper before us, because it deals with a subject which is of great importance to veterinary surgeons at the present day. There is no doubt, as Mr. Livesey says, that this disease is very common in dogs, and that many cases that are looked upon as eczema are scabies. It is often overlooked, particularly in certain breeds, such as Schipperke, on which I can speak with great confidence. Many of these dogs, which appear to have very little wrong with them and which are put down as suffering from eczema, are really suffering from mange. The ears are the principal places affected on account of their great vascularity and the thinness of the skin. That appears to be the particular hold of the disease. I have had a fair experience with follicular mange, and it is a peculiar thing how this disease arises. It is a thing which is very puzzling, and one in which there is much room for investigation. In some cases I have known only one pup out of a litter affected with the disease. It is very common in bulldogs and fox terriers, why I do not know. I have never met with it in a collie. I remember a case in which a Great Dane, a performing dog from Germany, was brought to me affected with the disease. I found that it had been kept with a bitch of the same breed, but while the dog had the disease very badly, the bitch had no sign of it. One of the lions, however, with which the dogs performed had the disease. I should like to ask any of the members present to tell me, Why did not the bitch take it? There must be something peculiar in the disease, if it is due to a parasite, why it should attack one animal and not another. The treatment I have used has been fairly successful. In my experience the dogs eat well when they have the disease except young puppies, bulldogs particularly, and they cannot stand the amount of dressing that is necessary to recover. As regards treatment, I have not tried the carbolic method, but I have been fairly successful with the iodide of sulphur ointment, which I generally use. Eczema is undoubtedly due to a great extent to the large amount of starchy foods and insufficient exercise which dogs get. Most dog-biscuits and meals are largely composed of starch, and I think it is due to dogs being fed upon them that a great deal of the disease is due. In my treatment the first thing I do is to knock off food of that description and put them on to something else. Pruritus is a disease that is sometimes very troublesome to deal with in little toy dogs that are owned by ladies, which continually scratch without showing the slightest eruption or anything the matter with them. In some of my cases, which have ultimately been proved to be symbiotic mange, it seems to lie in a dormant condition at the tips of the ears. The first thing is to get that softened, to treat the ears particularly, and then they get all right. But in pure pruritus I find that iodide of iron, given internally in the form of syrup, is the best thing to use. Interdigital abscesses are very common in overfed and under exercised dogs, or wrongly fed dogs. I look upon this as a complaint of a gouty nature, and treat it as such, taking into consideration of course the local treatment. With regard to the pustular exanthematous rash of distemper, for some years I have paid particular attention to this rash. It is only occasionally that I can find it, certainly not in anything like the large percentage of cases that Mr. Livesey mentions. I also do not agree with his statement on page (143), that "The swelling is now a conical pustule with often an irregular outline and with hyperæmic borders, sometimes circular, sometimes more or less oval, and sometimes attaining the size of a horse bean. In about six hours after maturity they rupture, the contents drying into a brownish scaly scab. If this is removed a pitlike depression is left, and if the pustule has been large a well-marked scar is left." I have never seen that. I have seen a small blister, which is an eruption, and a certain amount of serous fluid may pass out, but nothing like the amount Mr. Livesey mentions so far as my experience is concerned, and I have paid particular attention to find it. I quite agree with what Mr. Livesey says as to the treatment of cat wounds, that they are most difficult to heal. Many of them are tubercular. Alopecia I have seen several times, but it has always been associated with endometritis, and I put that down as the cause of it. There is no doubt it may be of a microbic origin.

Mr. E. L. Dixson: I should like to ask the essayist one or two questions. In the first place, I should like to know whether he has found that, in dogs which are brought to the seaside, symptoms of eczematous eruption or skin eruption occur as the result of their coming by the sea. Being in practice in a seaside town I have noticed that. I have kept in communication with the owners of dogs after they have returned to town, and although the treatment to a certain extent has amelioratəd the symptoms during the time they have been by the sea, the owners say directly they return inland the symptoms entirely disappear. I should also like to ask in what cases the use of animal food is indicated, as one is often asked the question wheather meat is injurious or otherwise. I should be very glad if Mr. Livesey could give me some information on those two points.

Mr. E. W. Baker: I have had a similar experience to Mr. Dixson with reference to dogs which are brought to the seaside from inland towns. On several occasions I have noticed on such dogs an eczematous eruption, which, as he states, improves or entirely disappears when the dogs return to their inland towns. On the other hand, on many occasions I have seen exactly the reverse take place. Dogs have been brought to the sea from inland towns, and the eczema from which they were suffering has improved. I attribute seaside eczema in part to the fact that dogs, generally, with their owners, are given to running about the sands and in many cases running into the sea, when they get their coats covered with a deposit of salt, which to a dog is of a very irritating nature and sets up the eczematous condition. I should also like to point out a fact of which many of you are probably aware, namely, that this increase of eczema is noticeable not only in our own patients, but in the human subject. One of my greatest friends, living in the town in which I now reside, dare not visit the seaside owing to the fact that he suffers from eczema, and immediately he gets near the sea his sufferings are something terrible.

Mr. P. S. Howard: I was very interested in Mr. Stent's statement with regard to follicular mange and its prevalence among bulldogs. My own experience entirely corroborates that statement. I do not think the cases of mange I see in all other breeds of dogs equal the number of those I see in bulldogs alone. I think that is rather suggestive, because it seems to indicate that bulldogs are born with some tendency in that direction, especially when one recognises also that the disease is next in frequency to the nearly related breeds to the bulldog, such as the bull terriers, Great Danes and bull mastiffs. I do not say it is hereditary, but the tendency of the dog to catch the disease is born in it. The fact of it being well known that it is exceedingly difficult to transmit the disease experimentally also lends colour to that view. Another thing I have noticed is that follicular mange is found in certain litters of puppies or dogs that are related. I have at the present moment a bulldog in my possession which has follicular mange, and the sister of that dog also has the disease. Another point which is very instructive, and to which more attention might be directed, is that of the breed. In this particular case the same sire occurs about three times in four generations, either the sire or very closely related blood in the sire. There is one question I should like to ask Mr. Livesey. He states that follicular mange is infectious, and I should like to know on what evidence he makes that assertion. With regard to treatment, up to a certain time I certainly regarded iodine as the best, but I have also used zinc chloride, and I have had better results from that treatment than from anything else. I have treated three cases in that way. The first was that of a bulldog which I did not dress personally, but the stuff was provided and used according to instructions, and the dog made a splendid recovery within six months. That occurred over a year ago, and he has remained perfectly well. His coat is not as good as it might be, being rather thin, but it is perfectly regular all over. The next case was that of a St. Bernard, which was in a most horrible state. I advised the owner to have it killed, but the owner would not agree to it so the treatment was proceeded with. I have not been able to cure him entirely, but the dog is very much improved. The next case was that of a dog which has not been cured yet, but he is progressing favourably, and I hope he will come round. I think the zinc chloride treatment is the best I have used so far. Mr. Livesey states that he washes the dog with soap and hot water, using a nail brush to aid in removing the scurf and the tops of pustules and pimples, but I should like to ask him how frequently he uses the zinc chloride, whether at the commencement of the treatment or periodically.

Mr. F. Hobday : Like the previous speakers I wish to congratulate Mr. Livesey on his paper on the skin diseases of the dog. My only regret is that it is such a vast subject, and that he has attempted to deal with all the different skin diseases of the dog. I would have much preferred him to have dealt with one or two of them which are especially difficult to treat, and bring them to a reliable conclusion, if such a course had been possible. The skin diseases of the dog are very numerous, practically almost as numerous as the skin diseases of the human subject. The difficulties that we have to deal with in treating them are very much increased because we have the hair to think of, the owners not wishing the animals to be disfigured ; but we must do that before we can get down to the skin to treat some of the very intractable cases. Another difficulty which we have to think about is that of applying grease dressing unless the animal can be brought into hospital ; and a third very great difficulty is that many of our patients are very delicate in constitution, and it is extremely difficult to treat the whole of the skin if the whole of it is infected, because of the danger of dressing more than a certain area at one time. With regard to the manges of the dog, Mr. Livesey has told us that there is a considerable amount of difficulty in finding the sarcopt. On the other hand Mr. Peddie has told us that it is found tolerably easily, but my own experience is that it is very difficulty to demonstrate it. I am perfectly sure that a large proportion of the cases which have been mentioned by other speakers, of dogs which apparently were suffering only from an itchy skin, there being nothing to be seen, are really cases of sarcoptic mange, the progress of the disease being kept under by the animals being frequently washed with a little disinfectant in the water, and by the cleanly condition in which they are kept. I could put my hands on quite twenty or thirty dogs at the present time where I am perfectly sure that the itchiness is entirely due to sarcoptic mange in a comparatively early stage, or in such a condition that, by the cleanly conditions under which they are kept, it never develops sufficiently to enable one to state definitely that it is mange. But I know it is mange because I know the kennels from which those dogs have been brought, and it is particularly in one or two of the fashionable breeds at the present time. I could absolutely stop the sale of a number of dogs if I was not professionally tied to secrecy by not being able to mention that I know that mange exists in certain kennels. Those who own a large number of dogs, who are continually buying dogs, and who have dogs and bitches visiting their kennels, are always bound within a couple of years to get mange in the kennels, and if it is not severely dealt with at the time it spreads through the whole lot, for there is nothing more contagious. With regard to demodex mange, it is very gratifying to find there are practitioners now who will get up and say that this disease is curable. Since Mr. Almond brought forward his treatment by chloride of zinc, quite a number of practi tioners whom I know have been able to tell me that they have had what are apparently cures from this treatment, and it certainly seems to be one of the best that has yet been brought before the profession.

(Adjourned for lunch).

At the time of the adjournment I was speaking on the question of follicular mange. The other form of mange I quite agree with Mr. Livesey yields to treatment. I do not quite agree with him that one can cure it with certainty in a fortnight, but the treatment is rendered much more simple if one has the hair of the coat off. In that case a few applications of a parasiticide are sufficient. It is a disease that we can tell our clients we can cure with certainty and in a short time if they will allow us to do as we wish. With regard to follicular mange, it was very gratifying indeed that several gentlemen have had what they could state were cures. For my own part I am still sceptical about undertaking the treatment with a promise of curing this wretched disease. For two years I devoted all my spare time to the treatment of follicular mange, and it is astonishing to anyone in London how many cases one gets there. It is a most prevalent disease. I used to be taught at College in student days that it was a disease not very frequently met with, but I am quite sure that in a busy canine practice a man gets certainly forty cases a year. I am sure I see forty cases a year. My experience of treatment has been so disappointing that, unless the owner insists upon it, I put the dog away. I have one dog at present which, if I can manage it, I will try and save, because I understand Mr. Almond is willing to undertake the treatment and try to get him well. I have also noticed, as Mr. Howard pointed out, that it is very common in bulldogs, my own opinion being that probably the tendency is hereditary. It is only an opinion, but I know in bulldogs it is very common indeed, and certainly it is increasingly common in that breed, especially in London. I have seen the cases that Mr. Livesey refers to, in which the appetite fails and great marasmus ensues; and I have noticed, as he points out, that in many instances if you start to dress the dog with a watery dressing and give him different baths, you absolutely increase the disease and sometimes its progress. Even in a week it progresses to such an extent that you had far better put the animal away at once. At present I have a troublesome case going on in which a client accuses me of having given his dog this skin disease. I informed him that the dog had a little follicular mange when it came in. Unfortunately I was foolish enough to treat it with cooling dressings, and in a week the dog was in such a state that it had to be put away. He threatened me with an Action, but of course he had no grounds of complaint. There is one drug that has given me absolute cures that have lasted over twelve months, which is worth thinking of as a principle of treatment in every application when you get a very localised patch. At the present moment I have a tiny toy bull-terrier. He had a patch on the middle of the back about as large as two-thirds of the top of a pencil. They are dogs with very little hair. This patch was as smooth as a piece of satin. I found the parasite, squeezed all the pustules out, and painted the patch with collodion. The idea was to get rid of all the mature parasites and then keep the air away from the place, and I believe there is something in the principle. It may put someone on the track of a drug which we can use in this way. This is the second case of the kind I have known, and there have been absolute cures in these two particular instances. Whatever treatment is used I am quite sure that the first thing to do is to squeeze out as many of the parasites as possible. I do not think the material which is used afterwards should have so much credit for making the cure as the fact of doing this squeezing out. It is a most unpleasant thing to do, but to get a cure I am sure you must do it. I do not think anyone is justified in saying that one has an absolute cure until twelve months have passed, because over and over again have I seen what are called cured cases at the end of six months, but in seven, eight or nine months the dog has come back with the disease breaking out again almost as bad as ever. With regard to eczema, the fact of animals going down to the seaside getting an eczema through going into the sea water or through being in sea air is a thing which I have already noticed. I know a number of dogs who go to the seaside in the summer time, and they invariably get a little of this eczema ; but when they come back to London, if they get back to me quickly enough, my remedy cures them. Certainly if dogs are put in certain districts they are subject to eczema. With regard to the question of dieting, what Mr. Livesey says about putting dogs on meat alone and taking them off starchy food and potatoes is perfectly right. If we can get them into hospital we can certainly always get them temporarily better by treatment which mainly consists of a raw meat diet. Mr. Livesey tells us that nearly all cases of canker are caused by acari. That has not been my experience in the dog. I have tried to find the parasites in the dog and have failed, but in the cat one does almost invariably find the acari. In the dog, however, so far as my experience is concerned it is a very uncommon thing to find. Cases of furuncle are not commonly met with. The folliculitis is super-active owing to the presence of staphylococci. If by chance you happen to be near a hospital where staphylococci sera can be produced, it is worth while to know that by getting a number of the staphylococci out of several of the pustules one can get a vaccine made in about three days, if the dog will live for that time, which, if given under the skin, in the human subject at all events, gives a wonderful cure almost at once. I have had the opportunity, with one of the bacteriologists in St. Mary's Hospital, of trying it once, but unfortunately my dog was a little too far gone and it died. But that is in the human subject, practically a certain cure for furuncle. There is a condition in the dog in which millions of staphylococci can be obtained from squeezing out a few of these pustules, and if the proper man can be got to take the trouble to prepare the vaccine it should form, on all theoretical grounds, as perfect a cure as in the human subject. As to whether urticaria occurs in the dog or not, I am sure it does. I have frequently seen it, and it is often a disease in puppies. The thing for the practitioner to do is to get the medicine in as quickly as possible. Pruritis in dogs is very troublesome in the summer time. Apparently there is nothing to be seen on the skin of the dog. This summer we have had literally scores of patients. The treatment is to keep them going with cooling medicines. When the cooler weather comes the dogs as a rule get better, but while it lasts the pruritis is very troublesome indeed. With regard to interdigital abscess, Mr. Livesey mentions it may arise from the presence of a foreign body in the shape of a barley corn, which is very common in some districts. I had an instance last Monday of another kind, where a piece of wood was taken away from the abscess, and in another instance a wild oat awn had worked its way up the leg, nearly as high as the elbow: the tract of it was quite distinct. There was septic infection from the tract of it. I traced the sinus right away up the leg, and to my astonishment found a whole wild oat, with a long horn on it. As to the question of the pustular exanthematous rash of distemper in dogs, Mr. Livesey say he has only failed to find it twice in his last 120 cases. My experience has not been so fortunate. Since Mr. Gray brought forward the idea that every dog which had distemper, or was in the incubative period, had these pustules I have looked for them, and when three or four of us have examined a dog we have looked carefully for them, but I do not think the concensus of opinion amongst the profession is that a dog which has these little pustules does of necessity get distemper. There are several other things which it may have. Teething rash, a term which Mr. Livesey ridicules, is the proper term I think to apply to it in puppies in some instances. It is very interesting to read in the paper that, with wounds in the region of the neck and limbs of the cat, tubercle bacilli are practically always found. I certainly should never have thought of that. It seems rather a sweeping assertion to make. With regard to alopecia, that is also a very great trouble, but if the hair bulbs are present it is astonishing what good results are obtained by the use of a lotion with chinosol in it. If a mixture of a grain of chinosol to the ounce, with one or two ounces of glycerine and some water is applied with a little wadding or a small sponge or in a little stream, twice a day, it does not make the skin sore and it is absolutely astonishing, if the hair bulbs are not destroyed, what it will do. It is a thing we found out in utilising chinosol at College, and I believe the students use it for their moustaches. With regard to treatment there is one point which is obvious to all of us and to which too much attention cannot be directed, namely, that the skin of the dog is a very quick agent for absorbing all dressings. Whatever dressing we use, if it is poisonous to the parasitic form of life it is poisonous also to the higher forms of life. Practically all the poisons we use as parasiticides in parasitic skin diseases must be used with a certain amount of caution. It is worth while to note that, if it is possible to clip the hair off, one not only gets at the skin better and cures the dog better, but one is much less liable to give a toxic effect than if the dog is left in a greasy dressing with a long clammy coat on. In cold and wet weather it is always necessary to be careful in dressing a dog all over the body.

Mr. F. L. Gooch : I am very much obliged to Mr. Livesey for his very lengthy paper. Until it came before me I thought I was a canine clinician, but I certainly see that I am not at the present time, because many diseases have been mentioned in the paper that I have never diagnosed in the dog. It is very fortunate for some of us who treat, perhaps empirically to a large extent, the skin disease of the dog, that, as Mr. Livesey states, so many of the remedies which are applied to one are equally applicable to the other. With regard to follicular mange, I am sorry to say that I have seen a very few cases of it, and I was surprised to hear Mr. Hobday say that in twelve months he had seen forty cases. I do not think that can be the experience at any rate of country practitioners. I do not remember, in a period of twenty years, treating more than four cases of follicular mange in the dog, and they were all in pugs. Possibly it is due to my non-diagnosis of the cause, but certainly I have never been able to find the demodex itself. One of the speakers has alluded to the cyst-like bodies that are seen between the claws of the dogs, and he attributed them to the dog being of a gouty disposition. I do not agree with that, because the majority of the cases I get are in sporting dogs, more particularly spaniels and retrievers, and I think possibly those two breeds of dogs are the least disposed to rheumatism or gout of any breed of dog. My experience is that these cyst-like bodies are nearly always present in clumber spaniels or the long-haired retriever. As regards warts, I was very glad indeed to hear two or three members, more particularly Mr. Peddie in his opening remarks, say that they took out the warts that occur frequently after eczema on the back of the wire-haired dog. I take a small pair of curved scissors and clip them out, and with a little ordinary treatment they are easily got rid of. I take this opportunity of thanking Mr. Livesey for his paper.

Mr. F. W. Garnett, J.P. : There is only one portion of this paper to which I should like to allude, and that is with regard to the external parasites which cause skin affections. On the first page it will be noticed that Mr. Livesey includes in the genus pulex those fleas which affect the dog, the human being, and hares and rabbits. Investigation in recent years has been directed to external parasites, and it is continuing, and almost a revolution has come about in the classification of the whole of the parasites affecting the domesticated animals. This applies to the fleas and also to the acari which affect our animals. He correctly calls the human flea the Pulex irritans, but that is the only species in the genus pulex there is on the face of the world. It belongs to the non-combed eyed siphonaptera. It is the only parasite which belongs to that great family of the pulicidae which affects any animals. There is no other species of that genus at all as far as I know in the world, whereas what he calls Pulex serraticeps and Pulex goniocephalus belong to another and totally distinct family of pulicidae ; *i.e.* the combed-eyed siphonaptera. It is usual I know in veterinary literature up to the present to class all fleas as pulex. With regard to the other parasites that Mr. Livesey mentions, on page 128 he mentions the harvest bug and calls it the Trombidium holoserisceum. That is correct if he would state that that is the hexapod or larval stage of the parasite that he alludes to. I had a very interesting specimen of this parasite from the dog sent to me the other day by Mr. Charles Roberts ; I think it was in a Dachshund which had been literally covered with these small red parasites causing very acute irritation. They are much more common than people think. I have not seen it myself on the dog, but I have on several occasions seen it on the sheep. It would be interesting to know—and I daresay Mr. Livesey can tell me—how long these parasites exist on the dog. I do not think it will be more than from seven to ten days, perhaps not so long, because they are only present on the dog or any other animal up to their first ecdysis. As soon as they have engorged themselves they will drop off, I believe in that period, and they are not parasitic on animals at any rate in any other stage of their life history. They are much more frequent down in the south, especially during such a summer as we are having now. I believe they can get the infection from lawns or gardens or anywhere just the same as sometimes children and older people do, and it causes very acute itching of the legs. Turning over to page 135, where Mr. Livesey deals with canker in the dog's ear, according to the English literature this parasite is known as Symbiotes auricularum. Any gentleman who is acquainted with the genus Otodectes at all and who has examined this parasite will at once recognise that it is totally distinct from the genus Symbiotes. There are four genera of acari which trouble our animals, namely, the Sarcoptes, the Psoroptes, the Chorioptes or Symbiotes, and the Otodectes according to Canestrini who has originated this new genus, the Otodectes. It is the Otodectes cynotis which is the cause of canker in dogs. There is another species, the Otadectes furonis, which attacks ferrets and animals of that species in England , but the name of this parasite has been accepted by German, French, and Italian acarologists as Otodectes cynotis. It is certainly not a symbiot in any shape or form.

Prof. G. H. Wooldridge: I must first of all thank Mr. Livesey for bringing his paper under our notice; but I agree with some of the previous speakers, and I think Mr. Livesey himself will agree with them too when he comes to reply, that if he had realised at first the extent of the ground which the title of the paper covers, he would never have attempted it; he would have taken some of the skin diseases rather than attempting to take the lot. The result has been that he has given us a paper with a lot of generalities and very few details about any of the diseases in question, while at the same time it has caused him a lot of confusion. I refer in that connection to eczema. Mr. Livesey tells us that a number of practitioners confuse other diseases with eczema, and then he proceeds to show us that he falls into the same error himself. I do not think there is any better example of it than the reference to the disease of the external ear of the dog. In many of these cases of canker, so-called, he calls them eczema. At one place on page 135 he refers to a form of eczema on the internal surface of the ear flap. I do not think the condition he is referring to there should be called eczema at all. Eczema so far as I understand it is essentially a vesicular dermatitis; it is a vesicular inflammation of the superficial layers of the skin. I disagree with Mr. Livesey's definition that it is a catarrhal condition in the first place. In true eczema the primary lesion is always a vesicle. The amount of liquid present in that vesicle varies. In some cases where it is considerable the vesicle bursts, and we then have set up a condition which we call moist eczema. In other cases the amount of moisture is small, and it is absorbed by the epithelium covering the surface. That is the condition we find very often in cats and dogs when we pass our fingers over the affected patch and find little nodules. Those nodules are the second stages of the lesion. The later stage is where these pieces of epithelium are thrown off. So that this so-called catarrhal condition of the skin is really a late stage of eczema, the primary lesion being a vesicle. There is one form of eczema which Mr. Livesey has not referred to, at least I cannot find any reference to it, and that is the form which appears to be clearly under the influence of the nervous system. I refer to what is called Herpes Zoster, corresponding with shingles in the human subject. Last week I had a case brought under my notice, which in my experience is unique, and which I considered to be one of this variety. It was a case of eczema running from the quarter down the hind leg, and following as near as one could ascertain the course of the sciatic nerve. In other instances I have found it quite common in dogs that have paraplegia following distemper, where they lose considerably the use of their hind legs. Quite commonly in these cases, from the hocks downwards, I find a skin lesion which, on careful examination, proves to be purely a vesicular inflammation of the skin, and which I take to be this nervous form of eczema. When the dog is treated for his nervous complaints by nerve stimulants, such as strychnine or arsenic as the case may be, and he recovers from the paraplegia, the skin disease disappears spontaneously. I have found no amount of local application without internal application of any service in those cases. Coming to the question of the pustular exanthematous rash of distemper, I must offer a severe protest against the language Mr. Livesey uses. I think he is not justified in looking upon this as a disgrace to our profession, because I do not at all agree with him that this lesion is in any way so common in the dog as he would have us believe. In my experience, at any rate, the lesion will occur in about a quarter of the cases. In about 25 per cent. of the cases of distemper seen early I have found this lesion, which is very admirably described by Mr. Livesey, with the one possible exception that he calls it a conical pustule. In my experience it is a flat pustule. With regard to alopecia, there is a baldness which commonly affects dogs, and I have had by far the best results from the use of salicylic acid dissolved in spirit, mixed with castor oil, and applied locally once a day. In some cases I have added a little tincture of cantharides as a stimulant with very good results.

Mr. E. W. Hoare : I congratulate the essayist on the production of a most interesting and instructive paper. For many years the Association has neglected the diseases of the dog, because you will not find in the list of the subjects dealt with at the meetings any dealing with this animal, and I therefore think the Council of the Association have been very wise this year in proposing that the diseases of the dog should be taken up. I think they have also been fortunate in asking such an enthusiast in canine medicine as Mr. Livesey to read the paper. In my younger days very little attention was paid to the diseases of the dog. Following the practice of some of my predecessors, we were taught that there were three different kinds of skin diseases in the dog. The first was mange. Everything was mange at one time; mange was put down as being carried from one dog to the other. Then eczema came in and, thirdly, we had follicular mange. When a dog could not be cured, it was follicular mange, and there was the end of it. But in the present day, thanks to the investigations, I do not say by Continental but by some of the British authorities, we can congratulate ourselves that our knowledge on the point has greatly advanced. Although we have not yet placed the skin diseases of the dog on the level they should occupy, we have at any rate approached to it. Touching the question of follicular mange, I am sorry to say I have not been successful in its treatment—I do not say unsuccessful in curing the primary lesion, but unsuccessful in preventing a recurrence, because my experience has been that in nine cases out of ten it has recurred. In fact I have taken dogs from the owners and kept them at my own expense in trying to cure them, and have failed. The opener of the discussion this morning took exception to what the essayist has put down as regards debility being a symptom of follicular mange, but my experience has been that in a case that becomes generalised and in which the dog has been affected for a certain time, he gets debilitated and weak, in fact so weak that the client has generally asked me to destroy him. With regard to eczema, I regard eczema as a protean disease. If any one of you will take the trouble to consult a text book on human skin diseases and read, or rather wade, through the chapters on eczema, I think you will find that the disease is thoroughly entitled to be called a protean one. It is protean in its symptoms, its pathology and its treatment. I think there is no doubt in the world that eczema is a constitutional disease. There are some dogs which, feed them as you will and treat them as well as you like, they will get their periods of eczema just the same as human beings. I do not think any diet will stop or prevent these dogs getting the disease. With regard to urticaria, I have seen many cases of urticaria in the dog with exactly similar symptoms to those manifest in the horse. I have seen them mostly in the warm weather and mostly in dogs that are overfed. With reference to the eruption in distemper, I think the chief explanation of the eruption in distemper not being found is that it has not been looked for. If you go to a great number of veterinary surgeons who have not had experience of dog diseases, and ask them about the eruption in distemper they will laugh at you. Men who have no experience of canine diseases never look for it, and the natural tendency is to say there is no such thing. Men who have experience in canine diseases naturally look for it and find it. My experience is that since I have looked for it—it has not been very long, about five years—I have found it, but previous to that I should not have believed it. Now I look for it, and I find it is present in. I should say, every case if you look early enough. Something has been said about this paper being too general. I think Mr. Livesey has been well advised in making it general. He has not written his paper for a meeting of specialists in canine surgery; he has written it for the general practitioner. Supposing he had written his paper on eczema alone, would there have been any discussion? Certainly not! Nobody would get up and discuss eczema as a disease, but every man feels himself justified in getting up and discussing any diseases that particularly appeal to him. I therefore think he has been very wise in dealing with the subject of the skin diseases of the dog in a general manner, and leaving plenty of room for members to get up and discuss them.

The PRESIDENT: The remarks I am now going to make refer not to a dog but to a pig, and they deal with the question of alopecia. A most remarkable case happened in my practice which caused me to study the matter very carefully, and almost to come to the conclusion which Hebra arrived at, that the disease is not parasitic but nervous. I will relate shortly to you the nature of the case to which

I refer, which I saw simply out of curiosity—as a matter of interest; I was not asked to see her professionally. A very good specimen of a black Sussex sow, which had not a white hair on her, was sent to the hog. As you know, the sow generally receives some amount of scratching during the operation of copulation; and in the course of a week or two, wherever this sow had been scratched, along those lines the skin became white. Where the scars healed there was a white streak as though she had been cut with a whip, and the pigmentary matter of the skin had quite disappeared. You might have thought that the whole of the skin had been cut out, and wherever there was a larger place it increased to, perhaps, the size of a sixpence. The streaks spread bigger and bigger; the places as big as a sixpence became as big as a shilling or half-a-crown, and then there was perfect coalescence, until she had big white patches all over the back and sides and down the quarters. These began to spread to the head, forward, until the end of it was that, in the course of about four months, she was as white all over as the best Yorkshire sow you ever saw in your life, without a spot on her. That was a very remarkable case I think of alopecia which can be authenticated; I think there are one or two members present who know all about it. I consulted a medical friend, who I might almost call a specialist on this matter, and he said, "You look at Hebra.' I looked at Hebra, and I found he related that it was quite a well known thing in Africa for Negroes who became injured or scratched, (the injury was not very clearly defined) to become as white as white men. It is a very remarkable thing that alopecia should take that form. I relate the incident because it greatly interested me, and I hope it will interest you as well.

Mr. J. Peddie: Did all the hair fall out?

The President: No, it became white. Except for the physical characteristics of the animal, you would not have told her from a white Yorkshire sow.

Mr. George Smith: The remarks that have been made in the course of the discussion, especially those of the President with regard to colour, have brought certain things to my mind On one occasion I remember I had a blood chestnut mare which I bred myself. After working her one day very hard she came out in lumps, and when she changed her coat she spotted over with spots the size of a sixpence or a shilling. She looked a picture. But the next time she shed her coat she became a blood chestnut again. I remember I made £100 over her! Two other things occur to me. One of the speakers referred to the spaniel and the retriever, and said they were the least of all dogs subject to gout. It does not matter what breed they are, if it is bred in them they will have gout. With regard to eczema, I believe a good deal of it arises from in and in breeding. I do not care what animals you take, if you breed them close you will get eczema.

Mr. G. H. Livesey, in reply, said: I have to thank you, in the first place, for so kindly receiving this paper and reading what I have gathered together. I particularly wish to thank Mr. Peddie for the very able way in which he opened the discussion, for the very great care and labour he expended upon the paper, the trouble he has taken to read the subject up and to be thoroughly well acquainted with it in order that the discussion might be properly opened. I think first of all I owe an explanation with regard to the paper. Several speakers have said that I have been too ambitious, that I have taken a large subject, dealt with it in detail, and made that detail all too scanty. It arose in this way. I was told that the subject of the paper I was to give to this Association was Skin Diseases of the Dog—not eczema, nor mange, nor follicular mange, any one of which I should have been glad to read a paper on. My subject was Skin Diseases of the Dog, and I was given approximately from twelve to twenty pages of foolscap into which to get the whole lot. If one has to review a large subject like this in a small space, it stands to reason that one has to condense one's subject to the utmost and not run into useless detail. It is only possible to give the heads and little points which you think will arouse discussion and stimulate members to speak. I think the discussion has proved that that has answered very well.

With regard to Mr. Peddie's remarks, he thinks that I have given too little space to scabies and to eczema, saying that I have only devoted four and a half pages to each of those subjects. Well, that accounts for nine out of twenty pages, and I think if one gives nine out of twenty pages to two diseases and leaves only eleven for the whole of the rest of the pathology of the skin he has not done the subject injustice. Then Mr. Peddie found fault with me for not giving the methods of diagnosing mange. I think that is not necessary in a meeting of veterinary surgeons. We have all been trained at College, and if we have not learned the methods of diagnosis there we have certainly learned afterwards in practice how to find the parasite. I am sure that any man who really takes the trouble can find it. Then Mr. Peddie asks me what is petrol. That proves to me that he is not a motorist. By petrol I mean ordinary motor spirit; I believe it is sometimes called benzine spirit; it is one of the highest petroleum products. Then with regard to follicular mange, at one time I certainly thought with others, as I was taught, that follicular mange was incurable, or perhaps that was modified to the extent of saying that follicular mange was curable in so few cases that it was not worth treating. Now I have completely altered my opinion, and I am glad to find that so many present have been able to confirm what I have already found, namely, that they have been able to cure follicular mange, and to do so at a profit to themselves. The method I have tried, which I have mentioned in the paper, namely, the use of chloride of zinc, cannot be found fault with on the score of expense. With regard to the dieting of follicular mange, my experience before using the chloride of zinc method certainly was that the dog ate well. There was not a loss of appetite; the dog did not die of that until the disease became generalised, and it is impossible to say when the disease is going to become generalised and the emaciation begin to set in. The emaciation sets in long before the appetite fails, but when the appetite does fail that is an end of it. I have never been able to get a dog back on its feed once it has started to go off it; it invariably dies.

Then Mr. Peddie mentioned the use of formalin. I have used formalin, and I believe I saw a benefit arise on the patches on which I used it, that is on the body. I do not think Mr. Peddie will be wise if he makes up ointments or dressings containing formalin, even to the strength of 3 or 4 per cent., no matter what he combines with it, if he is going to apply it to the dressings of follicular mange on the face. It will drive the dog nearly mad. The formalin gets into the eyes and causes profuse lachrymation; the dog rubs his face violently, he tears it with his feet. He will then lick his feet, the stuff will get into his mouth and make him salivate profusely. That will last for four and a half hours to five hours, and I am sure if a veterinary surgeon applies a dressing like that in the presence of the owner, the owner will never send a dog to him again.

Then Mr. Peddie asked a question about the etiology of eczema. The etiology of eczema is a subject on which I must own I am profoundly ignorant. I spent a great deal of time—I hope I ought not to say I wasted a great deal of time—in wading through books on human dermatology to see if I could find out something about eczema and its cause, and I must own that the result to me was worse confusion. One book says one thing, one says another. There are various theories. The parasitic theory is held by several people, but I do not think at the present time it has been proved. Undoubtedly there are many cases of eczema, particularly vesicular eczema, where there is a moist surface, where there is a staphylococcic or streptococcic infection, but I do not know that it has yet been proved that these infections are part and parcel of the disease eczema, they are merely secondaries or concomitants. Mr. Peddie drew attention on page 136 to the absence of cirrhosis of the liver. I have mentioned in my paper that dry chronic eczema is particularly associated with kidney disease, cirrhosis of the liver and ascites. Mr. Peddie owns that he has not seen it associated with cirrhosis of the liver. I think if Mr. Peddie goes on and makes post-mortem examinations on another couple of hundred dogs he will come across a wave of cases that will astonish him. Possibly he has seen a large number associated with cirrhosis of the kidney. One of these days I feel pretty sure he will come across a large number of cases of cirrhosis of the liver. I myself have very frequently seen it, and I think there are other members who can confirm what I say. Mr. Peddie thinks I have rather scamped the question of eczema, but my excuse must again be the same, that I could not sacrifice the whole paper to one individual item. Then with regard to seborrhoea, Mr. Peddie finds fault with me for saying that there is a hypersecretion of oily matter and also of sweat. I think possibly Mr. Peddie may have overlooked the fact of the anatomy of the sweat glands in the dog. In seborrhoea there is undoubtly an outpouring of sebaceous material, but if the sebaceous gland is irritated I believe myself that in almost every case the sweat gland is irritated at the same time, because they are very closely associated in the skin. Mr. Peddie does not believe in the occurrence of psoriasis in the dog. I think very many of us have seen cases of psoriasis on the elbow and on the hock purple patches of skin covered with silver scales unlike any other form of skin disease. That is practically the commonest condition. The only other place where I have seen it has been on the back of the neck. As to pemphigus, that is a disease I have never seen myself, and I notice that nobody speaking to-day has mentioned it as being present. I mentioned it because there was no history of it having appeared in the dog, and Friedberger and Frohner say it never occurs, and that of the seventy thousand dogs that were treated at their hospital in Berlin not one single case occurred. But Mr. Gray happened to say very dogmatically to me one day that he had seen it, so I thought I would put it tentatively in the paper to see if anyone else had had a similar experience As to furuncle, I have seen many cases, and I think possibly others may have seen them but have called them by different names. Certainly they occur fairly frequently in my practice down here.

Mr. Peddie said he had not seen urticaria. I think that was one of the points that surprised me most of all in his remarks. There must be many of us down south who see it constantly, and I can only think that the explanation of it is that Mr. Peddie comes from the north country, Dundee. I should think it was quite possible that the climate of Dundee was very much colder than the climate of Sussex. Certainly in Sussex we get it fairly frequent. I have a little fox terrier of my own who has it, I suppose, three or four times every year, coming out just exactly as one sees it in the horse. As to warts, I do not think his remarks on that question call for very much reply, but the next point he raised does, namely distemper rash.

Mr. Peddie said he had not seen this distemper rash, but later on he went on to say he had seen a pemphigoid eruption in the dog, bladder form and not pustular. I can only express extreme astonishment that a man of Mr. Peddie's close observation should have overlooked this characteristic eruption of distemper, for I am certain that if he looks at a case of distemper from the early stages to the late he will be bound to catch the primary or the secondary eruption of distemper; he will see it and mark it, and when once he has begun to see it he will see it in every case. I was very sceptical as to its appearance for a long time, until I began to look rather more carefully and pay more attention to the little crusts I found on the skin, which were the remains of the previous two days, and then I began to find it in a larger number of cases; until now I do not think I should be afraid to say that I find it in every single case of distemper that comes under my notice. Mr. Peddie called it an eruption something like pemphigus, but in pemphigus, as seen in the human being at least, the contents of the vesicles are not permanent but citron-like, serous, whereas the contents of the pustules or vesicles in distemper are distinctly pustular. Then he says that the rash may go away and you have no further evidence of distemper; but if the dog has got distemper, though you may not see the rash you have the evidence of the disease before you. You may see a dog that to all intents and purposes is apparently well, but if you look very carefully you see a rash. The rash may pass in a day or two and disappear, and the dog still remains apparently well. But if you keep that dog under observation for a week or two, and subject him to a severe chill or some influence which will lower his constitutional strength, you will see the old-time typical symptoms of distemper come out in the same way as we have always been accustomed to see them.

Mr. Dixson asked if I found that dogs at the seaside are particularly subject to skin irritation. That I think is a very interesting question. Mr. Percy Simpson in his paper on Eczema before the Royal Counties Veterinary Society brought forward the same question. He found that dogs coming into the Thames Valley very often suffered from skin irritation, and when they are taken away recover. We notice it particularly down South, and I think perhaps the breed that shows it most is our friend the Scotch terrier. When he comes down from the country to Brighton, or to the south coast, or in fact to any seaside place, his skin, and back particularly, seems to be more liable to irritation and to a recurrence of the dry, chronic eczema. I have known cases which have been exceedingly difficult to cure, and which have repeatedly recurred down here, which, if they are simply sent over the hills to the other side of the town where the air is slightly different, are easily cured in a few days.

As to where animal food is contra-indicated, that is a very difficult question, and it opens up a very large subject which I do not think I have time to go into now. But the question of the diet of a dog—when farinaceous food is harmful and when meaty food is harmful, is a large question and is well worthy of someone bringing forward at a future time before such a meeting as this. Then Mr. Howard brought forward the question of the infectivity of dermodetic mange. That is a very interesting question, and I did hope that we should hear more this afternoon as to what the actual cause of the contagiousness of follicular mange really was. I myself have the opinion—I do not know on what it is grounded—that the contagious element is not necessarily the demodex folliculorum. I am very pleased to have the support of Professor Hobday in certain of his remarks. With regard to what he has said, I do not know that in the face of my experience with the zinc chloride treatment I should like to agree with him that few cases of follicular mange are worth treating. I agree with him and Mr. Howard that the majority of cases occur in the bulldog, and I think as a rule bulldogs have a very fair market value. If a bulldog is brought to a veterinary surgeon, he is either a pet, and therefore has a sentimental value, or, if he is brought because he has any pedigree behind him, he is worth at least £5; and if he is worth £5 it is worth paying another sovereign to undergo treatment. and it would pay a veterinary surgeon to cure follicular mange for a sovereign. As to the cause of interdigital abscess, it is very common from foreign bodies. With regard to what Professor Wooldridge has said—he also found fault with me as to the extent of my paper, and I hope my explanation will satisfy him—he spoke of eczema of the ear flap, and thought I had contradicted myself. I think if he will read the paper a little more carefully he will find I have not. I did not commit myself to saying that there are all these various forms. I say that this particular form is principally seen in the ear flap following the presence of the acarus in the ear. Various gentlemen have spoken about canker in the ear. I am satisfied in my own mind that eight cases out of ten of canker in the dog's ear that I see in the early stages are due to the presence of parasites, because where a dog in the first stage of canker begins scratching his ear, if then you will probe into the depths of the external auditory meatus with a small pledget of cotton wool, withdraw it and examine it carefully—if you fail examine again, even to the tune of examining twelve pledgets of cotton wool—I think you will satisfy yourself that the acarus is present. I think I was looking for that acarus for three years before I found it. When I did find it I began to find it in nearly every case. Mr. Sewell had exactly the same experience. I think you will find that in cats it is more common than in dogs, and particularly so in Persian cats. Mr. Gray is of that opinion, and I am sorry he is not here to back me up. He says he is perfectly satisfied that 90 per cent. of all Persian cats have it. I do not know that I could go quite so far as to say that, but I can say that in every case of canker in the ear of the cat I have invariably found a parasite; and I believe, moreover, that that parasite is communicable to the dog, because I have known of a case of canker of the cat's ear due to the presence of an acarus. I have seen the acarus in the cat's ear; I have seen a perfectly healthy dog taken into the house and in a fortnight develop canker of the ear, with the parasite demonstrated there afterwards. I thank Mr. Hoare for so kindly supporting what I have said, and I am only too glad that what I have written has satisfied such a keen and shrewd observer as that gentleman is. I thank you, gentlemen, for the attention with which you have listened to me. (Cheers).

Mr. S. Stockman: The discussion on Mr. Livesey's paper having concluded, may I make a proposition, namely, that in view of the shortness of the time the discussion on Redwater should not take place. I do not think we can possibly do it justice, and I am quite willing that I should not be asked to open the discussion. I make that proposition for the acceptance of the meeting.

Prof. G. H. Wooldridge: I fancy Mr. Stockman has some information which will be useful to the members if he will lay it before them. I suggest, if Mr. Stockman is agreeable, that he should give us that information, and that we should not enter upon a general discussion afterwards. We should benefit considerably by that.

Mr. Stockman: I could not do that. We could not have a discussion under those circumstances.

Mr. N. Almond: I suggest that, if the paper cannot be read and discussed, it might be printed with the Report of the Meeting.

The President: Having regard to all the circumstances, and especially as it is Mr. Stockman's wish, I think we must defer this great pleasure till some future time. The proposition comes from him with much better grace than we could suggest it to him. I regret very much that this should be necessary, but in the exigencies of the case it seems to me there is no other course to pursue at this meeting. I have tried all I could to shorten the discussions and to keep speakers within the points dealt with in the papers, but it seems almost impossible when there are such important papers read, as we have had this year, touching on so many points, to get the discussion over in the short time we have at our disposal. It is a question whether two days is quite sufficient for the meetings, and whether the time for the discussions will not have to be extended to three days, the Socials being held on the fourth day. We must either do that, or else at future meetings the President must risk getting himself into hot water by limiting the time of each speaker to, say, five or ten minutes. I have not thought it well to apply that rule on the present occasion because of the importance of the subjects we have had before us, but I am quite sure that some such limit will have to be made, otherwise we shall not get through with the business of the meetings.

Mr. G. Howe: As a provincial practitioner, I very much regret the decision come to not to open the discussion on Redwater. There is an alternative: I suggest that we hold a sort of informal meeting at 9.30 to-night. (Laughter).

Mr. E. W. Baker: I think it is a very great mistake for us to drop this discussion. In my opinion we had far better drop one of the social meetings of the gathering. I strongly support the suggestion that we should hear some remarks from Mr. Stockman.

A Member: I strongly support that, because I come from a district where we get thousands of cases of redwater every year. I have seen hundreds of cases this Spring.

Mr. J. F. Simpson : I think we must remember that we owe a duty to the President as well as to ourselves. After the labours of many months and of presiding over us so ably during the Session of this Association, I think, Sir, we must have some consideration for you and the lady who is to support you in receiving yonr guests at half-past four. I regret as much as anybody that we cannot hear the discussion upon this important subject, and I am sure the regret must be exceedingly great to those in whose districts redwater is prevalent. For myself I am quite content to let the matter rest, for the present at any rate, but it would be a great treat to look forward to another occasion when the delivery of an address by Mr. Stockman would be listened to with the greatest of interest and with much benefit to ourselves. Under all the circumstances, as there appears to be a difference of opinion in the meeting, will you permit me to propose that the suggestion of Mr. Stockman be accepted, and then we will take a division.

Mr. F. Hobday : Is it not possible to devote an hour to this subject ?

The President : You have to consider the ladies. They are waiting for us now.

Mr. J. Willett : I have an alternative suggestion. Could not we appoint another Chairman for the time being and relieve you, Sir, of your duties to attend to the social part of the Proceedings ?

The President, after consulting with his colleagues on the platform, said : Gentlemen, I have asked our friend Mr. Simpson to take the Chair for me, and I propose to absent myself for a short time. That will be a compromise. But at the same time we shall simply be able to take Mr. Stockman's paper ; there will be no discussion.

Mr. Stockman : I am quite prepared to go on ; I simply made my proposition in order to meet the convenience of the meeting.

The Chair was then vacated for a short time by the President, and taken in his absence by Mr. J. F. Simpson.

Mr. S. Stockman : Gentlemen, I have to apologise for the form in which this subject "Redwater in England, and its Carriers" is brought before you. I have been working for about three years in collaboration with Sir John M'Fadyean on the question of Redwater. I once spoke to Mr. Hunting about it, and he said, "Ah, the National ! " Sir John and I were rather inclined to give a combined paper on the subject, but as we have done a lot of work in the last three years it would have been quite a big paper. Unfortunately in the meantime I was asked for two big Departmental Reports, and I had to say to Mr. Hunting that we could not possibly do anything. Then Mr. Roberts came to me and said, " Won't you do something ? " He would not go away ; he was most persistent, and I promised him something. I have taken in my paper the most original pieces out of the three years' work, and I propose now to communicate them to you.

RED WATER IN ENGLAND AND ITS CARRIERS.

By Stewart Stockman, M.R.C.V.S.
Chief Veterinary Officer, Board of Agriculture.

After Smith and Kilborne in 1888 had demonstrated the presence of hæmatozoa (the pyrosoma bigeminum) in the red blood corpuscles of cattle affected with "Texas Fever," which is a disease characterised by destruction of the red cells and frequently by the presence of a visible amount of the colouring matter of these cells in the urine, similar observations were made in all quarters of the globe in connection with the disease which in England we call redwater. Five years later in 1893, the above authors showed that "Texas Fever" could be produced in susceptible cattle by inoculating them with the blood of animals suffering from or which had recovered from an attack, and that the disease could be carried indirectly by ticks. These later observations have also been confirmed in various parts of the world, particularly in Australia and South Africa, and on the continent of Europe, and it is now generally accepted that wherever redwater is observed as a disease of cattle, one may expect to find that it is associated with and caused by the presence of piroplasms of the bigeminum type in the red corpuscles.

Curiously enough it was not until quite recently that piroplasms were demonstrated in the red corpuscles of cattle suffering from red-water in the United Kingdom. The late Professor Nocard found them in the blood of an affected animal in Ireland in . Since then their association with redwater of cattle has been frequently established in many parts of the United Kingdon, and I do not think that anyone will now seriously deny that redwater of cattle, as we meet with it in England, is caused by the presence of piroplasms in the red blood corpuscles. But, to completely establish the analogy between British redwater and the kindred disease met with elsewhere and now classed as a piroplasmosis, it is not sufficient to demonstrate the presence of piroplasms in the red corpuscles. One must also show that it can be inoculated to other cattle by means of the blood of affected animals, for every piroplasmosis is not inoculable, and that it can be carried indirectly by ticks. In collaboration with Sir John M'Fadyean I have for the last three years been investigating redwater in Great Britain and its relation to the disease met with in other parts of the world.

A great deal of work has been done in connection with the life-periods of ticks in the field, and their relation to outbreaks of the disease. I do not propose to go fully into this, however, or to describe in detail the methods adopted, as we intend at a later date to publish a full report.

I will take first the inoculability of the English disease as this throws some light, I think, on the failures and successes obtained with ticks. If one was to judge by the experimental results so far published in the United Kingdom, one might be led to the opinion that the analogy between redwater in England and the Texas Fever type of disease breaks down over the inoculation test, and that the former possibly belongs to the type of piroplasmosis (East Coast Fever) which is not inoculable, for, so far as I am aware, all the published results up to date have been declared negative. Our results after inoculating the blood of cattle suffering from or recently recovered from English redwater make such a conclusion untenable, for although we have had some absolutely negative and some doubtful reactions, the majority of our results have been positive.

With regard to the reactions described as doubtful, I mean those which within the prescribed incubation period after inoculation showed a distinct febrile reaction, but in the blood of which no piroplasms could be found. The results obtained in Heifer 49 and afterwards with her blood illustrate an indefinite reaction. Heifer 49 was inoculated with 5 c.c. of blood obtained from an acute case in the field, and two days before the withdrawal of the blood used for inoculation piroplasms were numerously present in the red cells. Five days after inoculation the temperature of Heifer 49 rose 2° F., and remained above normal for three weeks, but no piroplasms were ever found in the blood in spite of daily examination. During the febrile reaction blood was withdrawn from Heifer 49 and defibrinated. From 2.5 c.c. of this blood were injected subcutaneously to six heifers. One of these, No. 54, had a temperature reaction commencing on the 7th day and lasting 3 days; the highest temperature recorded was 104·2° F. No piroplasms were found in the blood. The other five animals showed no reaction whatever.

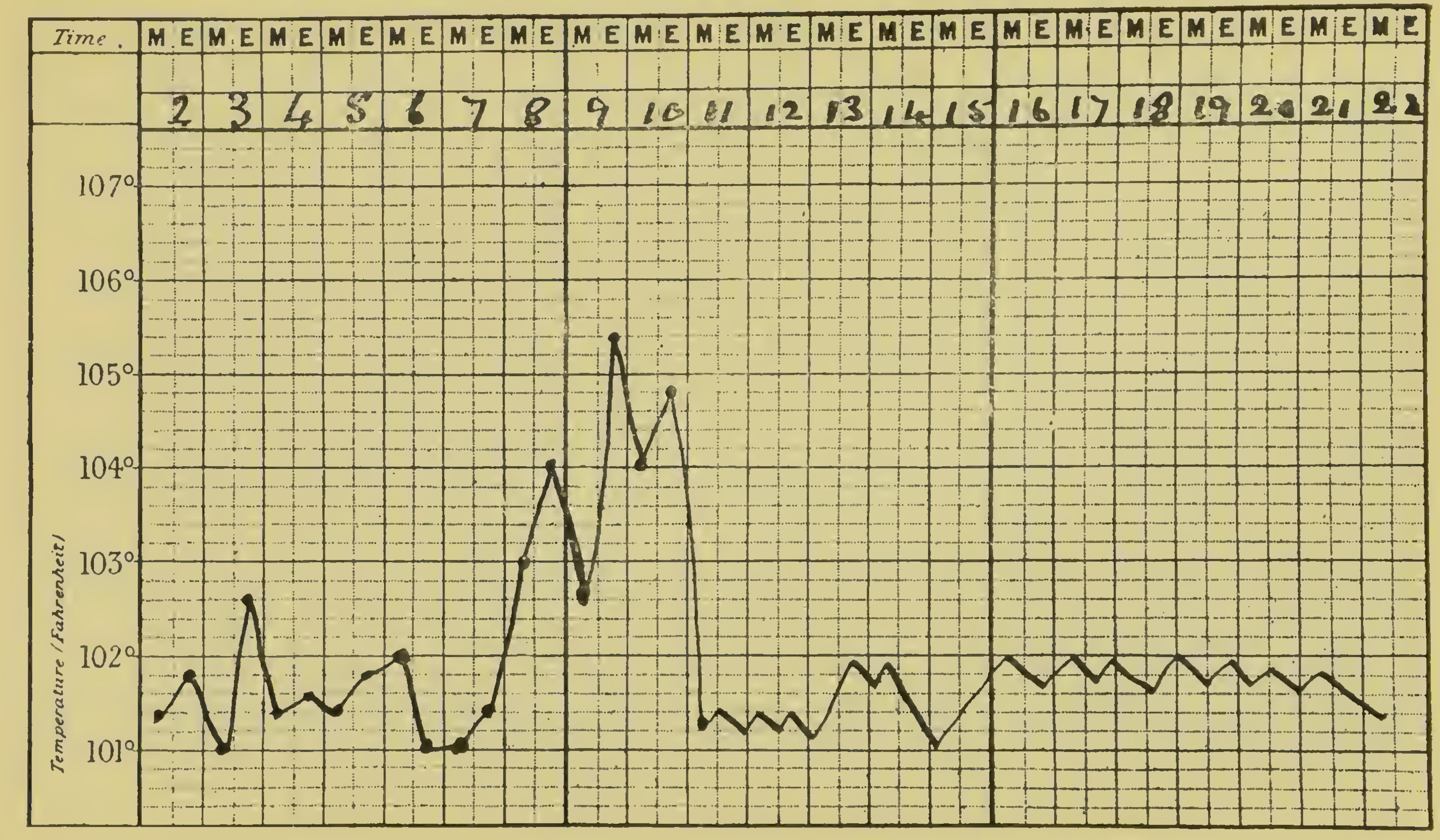
That the failure on the part of these five heifers to react to the blood of Heifer 49 was not due to any natural or acquired immunity is certain, because about a month later they all reacted more or less definitely to the blood of Cow 2, another case of redwater contracted by natural infection in the field. It is also apparent that the said heifers acquired little or no immunity from the blood of Heifer 49.

The following are the particulars of one of the said heifers, Heifer 3, inoculated subcutaneously with 10 c.c. of defibrinated blood from Cow 2, a month after she (Heifer 3) had failed to react to the blood of Heifer 49. The temperature of Heifer 3 rose to 102° on the sixth day and fell to 101° on the seventh. On the eighth day it rose to 103° morning, 104° evening. Smears taken from the blood on the eighth day showed a small but distinct number of piroplasma bigeminum in the red cells. They were also present on the ninth day, but could not be found after this. The remainder of the reaction can be followed from the attached chart by which it will be seen that the temperature became normal on the eleventh day, and remained so until the 23rd day, when a second rise took place (102-103°), which lasted three days. This second rise of temperature after a normal interval is typical of the redwater reaction, and as in the case of the first febrile attack it may or may not be possible to demonstrate piroplasms in the red cells. Two fellow heifers to Heifer 3, numbers 1 and 4, gave a typical febrile reaction, 106°F. within the prescribed incubation period, followed by a second after the usual interval, but no piroplasms could be found in their blood by microscopical examination. If, however, one inoculates a series of animals with the blood of an animal suffering or recovered from redwater, and one finds that they all give a febrile reaction within a prescribed period, followed by a second febrile attack after a more or less constant interval, while in the red blood cells of the majority, as in my experience, one finds piroplasms, one is, I think, justified in concluding that the reaction was due to the virus in the animals in whose blood piroplasms could not be found by microscopical examination, as well as in those in which the blood parasites could be demonstrated. This means that what I have referred to as indefinite reactions to inoculation may be looked upon as positive, and that an animal may be suffering from a slight attack of redwater or piroplasmosis, although no piroplasms can be demonstrated in the blood cells by the ordinary method of examination. This, it will be seen later, has probably some bearing on infection of the ticks themselves and on the transmission of redwater to cattle by means of ticks.

In order to further illustrate the reaction following upon the inoculation of blood from animals recently recovered from English redwater it will be useful to examine the results obtained on Heifer No. 1b which is one of another series of about 20 animals which have given a positive reaction accompanied by the presence of piroplasms in the red cells, and in addition the reaction in Heifer 1b was associated with marked hæmoglobin-

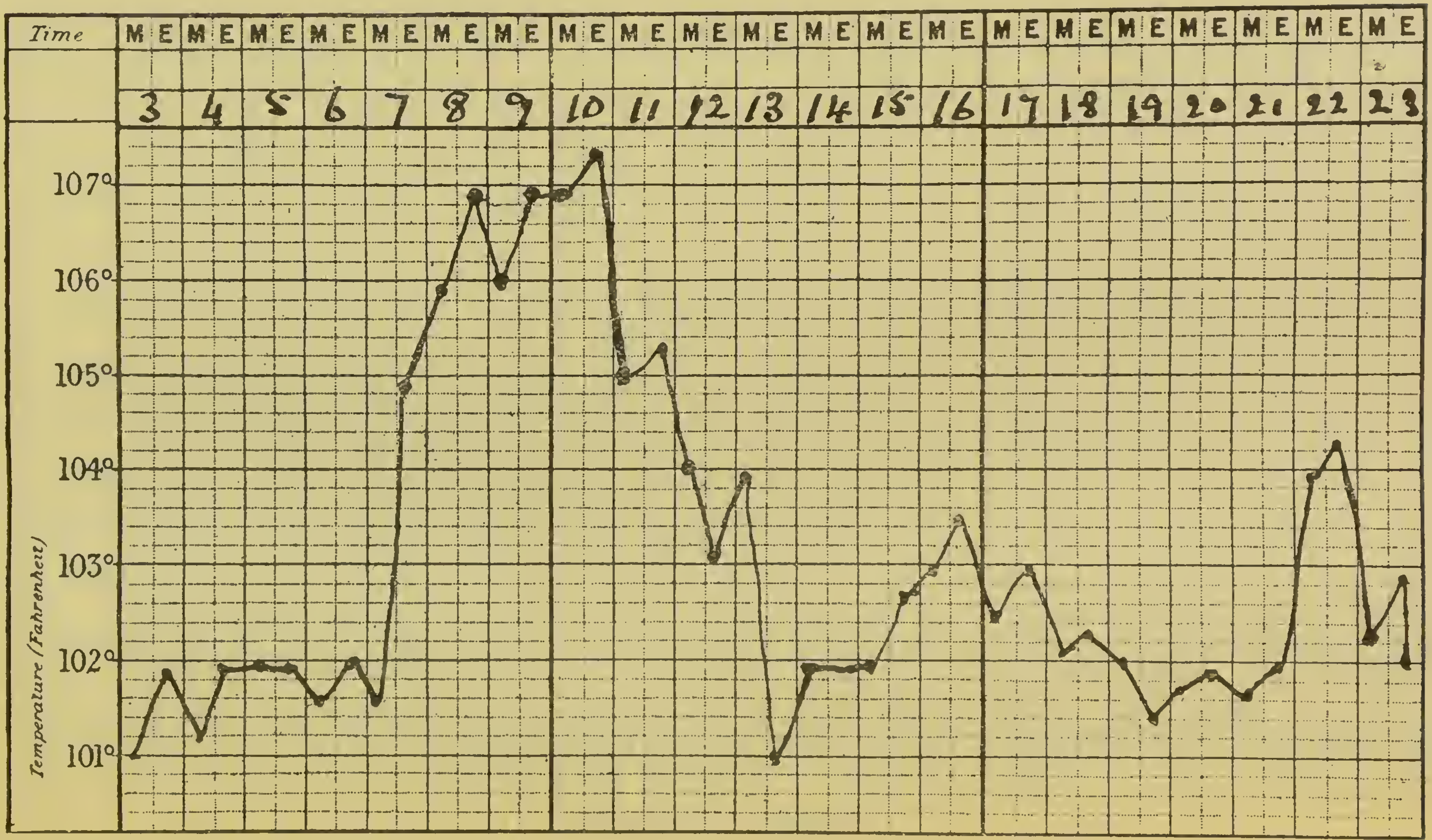
REDWATER. HEIFER 3.

10 c.c. of blood from Cow 2 on 1st September.



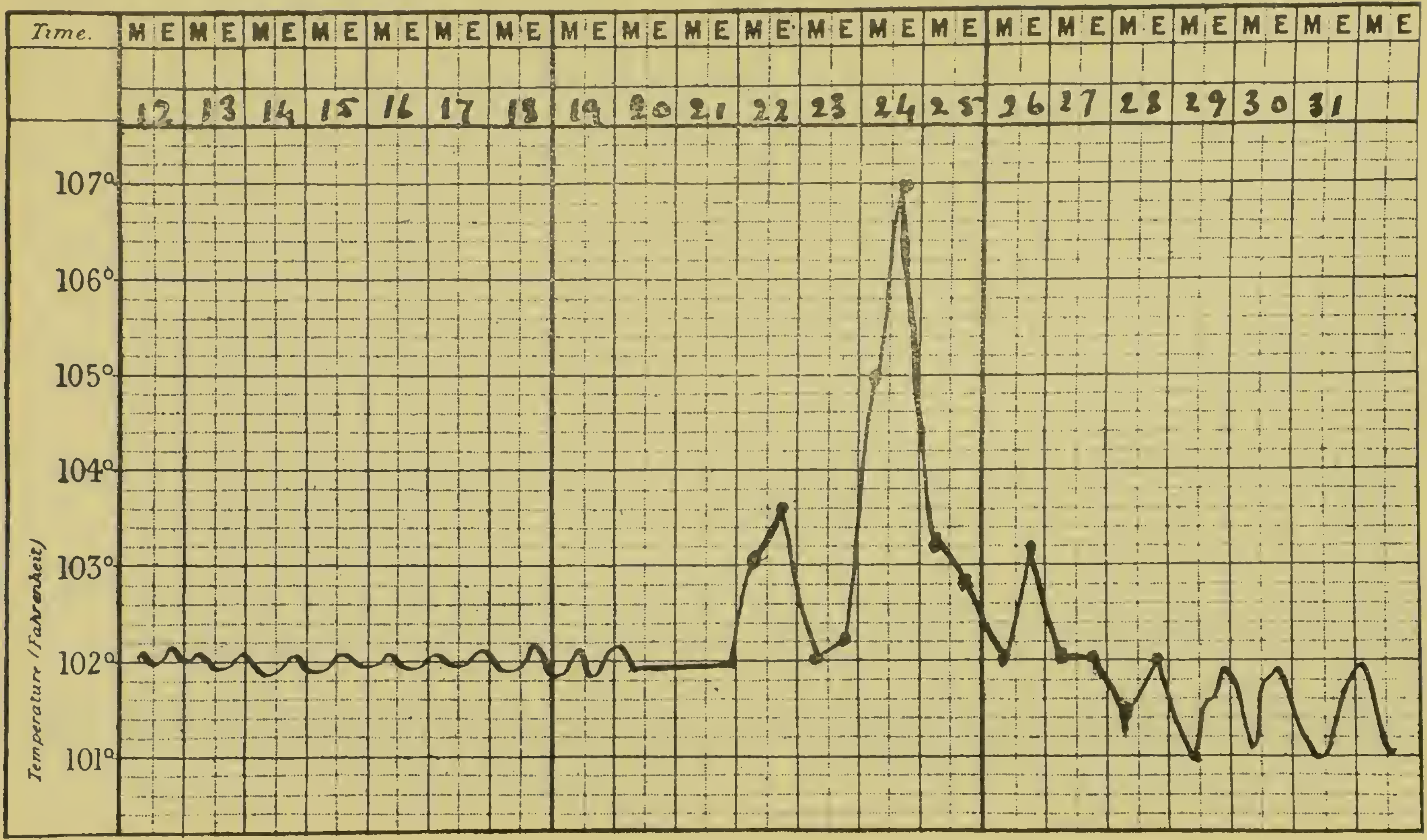
REDWATER. HEIFER 1 b.

10 c.c. of blood from Cow 2 on 2nd October.



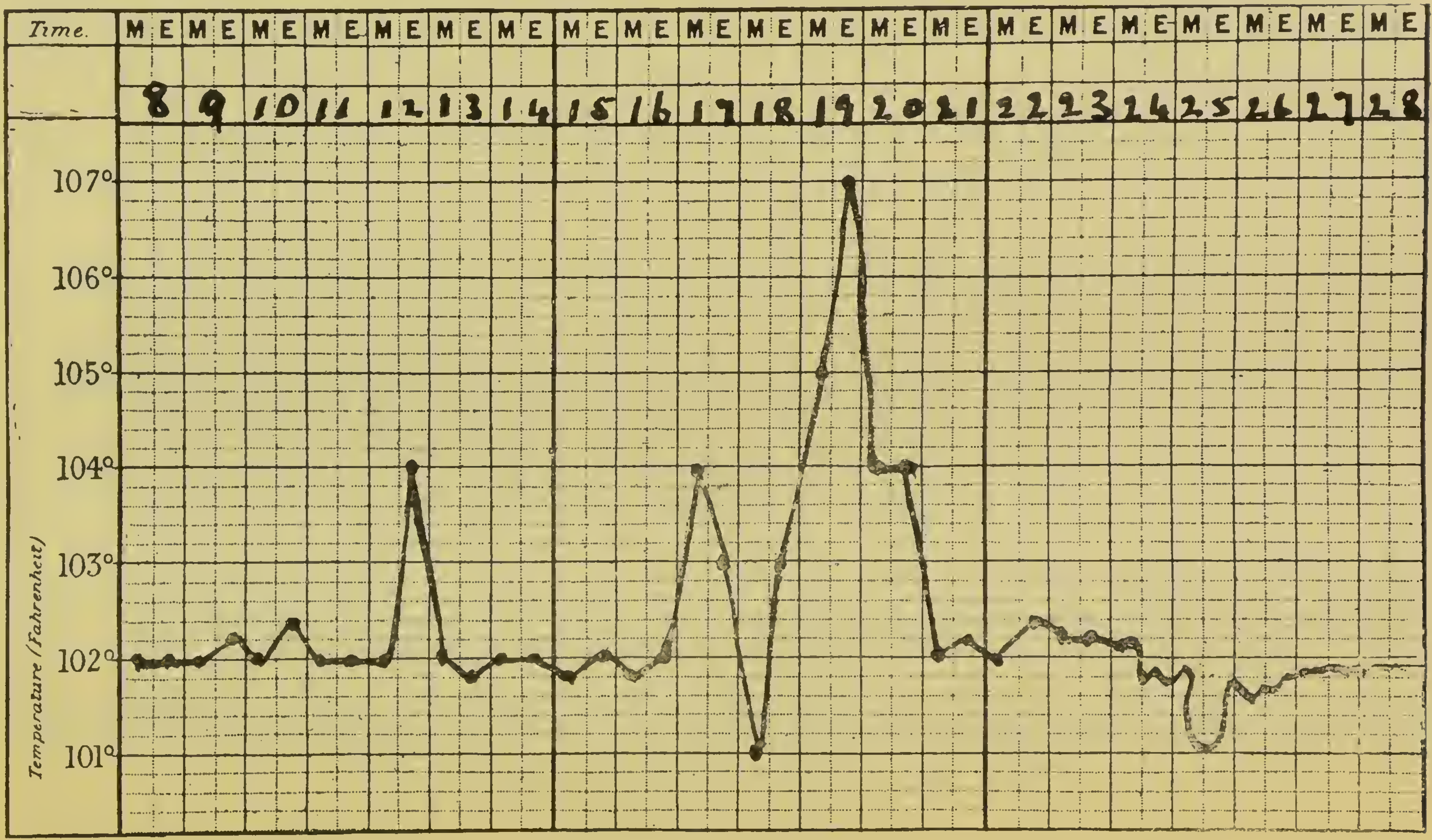
REDWATER. HEIFER 42.

Adults (punctata) placed on heifer on 12th October.



REDWATER. HEIFER 6a.

Adult ticks (punctata) which had been infected on Cow 2 put on this heifer 8th November.



uria which I have not found to be usual, but which still further convinces one regarding the nature of the disease inoculated. Heifer 1b was inoculated subcutaneously with 10 c.c. of defibrinated blood from Cow 2. This cow had recovered from an attack of naturally contracted redwater two months previously, but had had a severe relapse one month before her blood was used for Heifer 1b. The temperature of Heifer 1b rose to 105° F. on the fifth day after inoculation. It fluctuated between 105 and 107.2 for four days, and continued to be irregular for twenty days (see chart). Piroplasms were found in the red cells from the fifth to the tenth day after inoculation. Red water was passed on the 8th and 9th days. The red cells fell about two millions below normal. The proof is furnished then that English redwater is inoculable.

Several animals, however, reacted to inoculation feebly, while others apparently did not react at all. Feeble reactions and failures to react are capable of explanation in one of the following ways: (1) The blood used may have been of low virulence. (2) Too small a dose of blood may have been used, which in one sense at least is another way of stating (1). (3) The animal operated on may have had a natural or acquired resistance.

We have experiments showing that one may succeed with a large quantity of blood after failing with a smaller one.

We have also experimental evidence showing that a virus which produced a feeble reaction in moderate quantity, 10 c.c., caused a no more violent reaction when 100 c.c. were injected. Far from being a distinction between English redwater and the Texas Fever type of the disease, as one might possibly think from a perusal of general reports, it is really a point of analogy. My experience of South African redwater, however, as compared with English leads me to point out one difference which is not necessarily essential, and may be only one of degree, viz., that, whereas the difficulty in the former is to get recovered animals whose blood is of low enough virulence to make inoculation safe, it is comparatively difficult in the latter to get an animal whose blood is active enough to produce acute cases of redwater.

With regard to the third explanation of failure it is highly probable that some individuals may be naturally more resistant than others to redwater, just as one finds in the case of other diseases, but resistance of this kind is usually easy to overcome. Animals, however, which have recently recovered from a natural or experimentally produced attack, or which may have been exposed to infection on the pastures possess a high degree of resistance, although it does not always amount to an absolute immunity. We have several times, for example, failed to infect animals under the above circumstances with comparatively large doses of very virulent blood which produced decided reactions in clean animals, and we have in some cases produced a mild attack in a recovered animal by re inoculation.

The most resistant animals of all have been some which were bred on a redwater farm.

I think enough evidence has been brought forward to establish English redwater in the class of inoculable piroplasmoses. It still remains, however, to show that it is tick-borne, the proof of which has so far not been furnished in relation to British redwater. It is well known, of course, that animals sick of redwater will not infect others when tied up together in a stable, and yet the disease is inoculable. Such a condition of affairs of itself immediately suggests that it belongs to that class of disease which requires an intermediary carrier.

A difficulty presents itself when one goes into the field to obtain ticks, for one finds on studying the life history of those present on cattle and sheep that they all belong to the varieties which require three separate hosts for their development, and pass through two moults away from their animal hosts before becoming fully matured. The disease in America, Australia, Africa, and Southern Europe is carried by varieties of ticks which go on to the cattle as larvæ, and the females only leave when they are fully engorged adults. This variety is easy to work with, and it is the progeny of the mothers which have sucked on sick or recovered cattle which carry the disease to other animals; that is to say infection passes through the tick egg. The three sucking varieties on the other hand require considerable experience and attention to get them through their various stages for experimental purposes, and the losses among them are very great.

In England I have met with only two varieties on cattle and sheep, the Ixodes Ricinus, and the Hæmaphysalis Punctata, both of which are three-suckers, and so far as I am aware, no tick requiring only a single host has been found on these animals.

In common with the experience of others the former variety has been found most often to be present on redwater pastures. I do not know if the latter has been observed in Scotland and Ireland, but although its distribution in England is much more restricted than that of the former, I have obtained it from redwater farms upon which the Ixodes Ricinus could not be found.

With the Ixodes Ricinus our experiments have been few, and at present it need only be said that they have failed up to date to show that infection passes through the eggs to the young ticks.

With the H. Punctata the experiments have been more numerous, and it seems probable in view of the similarity in the life history of the two varieties that what occurs with the one will hold good for the other. In testing whether a three sucking tick is a carrier of disease or not, one must experiment with it in each of its stages, for it has the chance of infecting itself on a suitable animal under three different conditions: (*a*) by sucking as a larva it might after moulting give the disease to the host upon which it sucks as a nympha; (*b*) by sucking as a nympha it might after moulting give the disease as an adult; (*c*) by sucking as an adult it might pass the infection through the eggs to the larvae which would then be infected.

The ticks used for these experiments were all bred from females matured on sheep, so that there can be no question of their having been infected in the field.

EXPERIMENTS TO TEST NYMPHAE OF PUNCTATA WHICH HAD SUCKED AS LARVÆ.

(2). A number of larvae were fed on Cow 2. Cow 2 at the time was about a month recovered from English redwater, and her blood was proved to be infective by inoculation.

The larvæ dropped off and moulted to nymphæ in about three weeks, and twelve days later about 50 nymphs were placed on Heifer 50. The nymphs engorged, and dropped off in the usual time. The result was negative.

(2). Larvæ were fed on Heifer 124 while she was showing a small number of piroplasms in her blood. They dropped off engorged in the usual time and moulted to nymphæ after about a month. On Heifer 48 were placed 350 of the above nymphæ; no reaction ensued, and no piroplasms could be found during 11 days, when another 300 nymphæ were put on. She was kept under observation for five months. The result was negative.

(3). On Heifer No. 170 were placed about 150 nymphs which had fed on Heifer 123 when she was showing piroplasms in her blood. The result was negative.

(4). On Heifer 168 were placed 200 nymphs fed as larvæ on Heifer 123 when she was showing piroplasms in her blood. They were put on nine months after sucking and six months after moulting. They attached themselves in the usual way and filled up. The result was negative.

I am not prepared to assert from the above experiments that nymphæ which have fed as larvæ on a sick animal never convey the disease, but it seems likely that they do not do so readily, and it may be here pointed out that the amount of blood taken up by larvæ is comparatively very small. It is also possible that the piroplasms do not develop inside the organs of the larvæ.

EXPERIMENTS TO TEST ADULTS OF PUNCTATA WHICH HAD FED AS NYMPHÆ.

(1) Nymphæ of H. Punctata were fed on Cow 2 (English redwater) when her blood was found to be infective by inoculation. They engorged, and moulted in about a month, and were almost immediately placed on Heifer 42. Her temperature rose to 103° F., on the tenth day and to 105° morning, 107° evening on the twelfth day.

A few piroplasms were found in the blood, but not until the fourteenth day. The result was positive in this case.

(2) A month after moulting 24 of the same batch of ticks used in the above experiment were placed on Heifer 6a. Her temperature rose to 104° F. on the fifth day. One pair of piroplasms was found on the ninth day—temperature 104°. On the eleventh day the temperature was 105° morning, 107° evening, the piroplasms were distinctly numerous, and they could be found up to the sixteenth day.

EXPERIMENT TO TEST PUNCTATA LARVÆ FROM MOTHERS WHICH HAD FED ON INFECTED ANIMALS.

Adult punctata were placed on Cow 2 when her blood was known to be infective. They came off engorged in the usual time, but as the season was late, they did not lay until the late spring of the next year, and the larvæ did not hatch out until ten months after their mothers had engorged. On Heifer 125 were placed 200 of these larvæ. The heifer was kept under observation for three months, but the result was negative.

TREATMENT.

With regard to treatment there is little that I can say, and I prefer to leave this part of the subject to those who are going to continue the discussion. Ten of our cases of English redwater have required no more than careful nursing to prevent a fatal termination. Of course, it must be recognised that after a severe attack the consequent anæmia must be treated, but it is seldom rebellious.

It is frequently asserted that one must fear abortion as a complication of redwater, but none of our pregnant animals have aborted during an attack. We have observed, however, that œstrum is often delayed, and that when it does come on, the female generally returns once or oftener to the bull. I have also seen the sexual power of bulls materially weakened by an attack.

PREVENTION.

I wish only to speak in general terms on this part of the subject, as it is intimately bound up with the life-history of the ticks, and that alone would form material for a very considerable paper.

There are three methods under the head of prevention, which one may attempt to carry out.

(1) By inoculating with virulent blood all new animals before going on to the infected pastures, and nursing them, if necessary, through the attack, one may give them a degree of immunity to start with which will prevent them suffering severely from the infection conveyed by the ticks. The infected ticks themselves will keep up the degree of immunity so long as the animals are on the pastures. It is equally applicable to the above class of animal and to those bred on infected farms, that their resistance to redwater requires to be renewed by inoculation if they have been off the pastures for a time, during the winter for example.

It should be realized that by accepting the inoculation method one increases the animal's potentiality of infecting ticks, and one also makes up one's mind to accept the disease as a permanency. It should also be recognised, that so far as we know at present, the so-called immunity is not really an immunity, but is to be looked upon rather as a tolerance which depends for its continuation on the upkeep of the virus in the body. There is always a risk then, of this tolerance due to latent infection breaking down under the stress of other maladies which may attack the animal, difficult parturition for example.

(2) One may attempt to eradicate the ticks from the pastures and so dispose of the natural carriers, the only agents which convey the disease naturally. One attempts to get rid of ticks by fully stocking the pastures, and periodically dipping or spraying their hosts. The ticks under discussion, however, remain at each stage for a comparatively short time, 3 to 10 days, on their hosts, so that the chances of catching a large number at each dipping is not great, unless the bath or spray be resorted to at impossibly short intervals. There is no doubt, however, that by keeping up periodical dipping for some years one makes an impression on the number of ticks, but one cannot hope to completely eradicate them, as cattle and sheep are not their only hosts.

It will be gathered from the tick experiments that the seasons at which the adults are most numerous, should be those at which redwater is most prevalent. From observations on ticks bred in the laboratory, and hurried, as it were, through their life periods, these seasons ought to be March to June and October to November; possibly when a searching inquiry is made into things as they occur in the field and under more natural conditions, the periods of greatest prevalence may turn out to be somewhat different.

The most important periods for dipping or spraying are when the adult females are on the animals, not because the operations will at first diminish the number of cases of redwater, for the ticks will already have inoculated their virus, but because the greatest benefit is to be expected by killing the adult females before they can lay their eggs for the upkeep of their species. The ticks in question remain for a longer time on their hosts when in the adult stage (10 days or more), and this is a further reason for pushing the dipping or spraying at this time.

The most useful agent for the destruction of ticks is an arsenical solution or a paraffin emulsion. The effects of dips, however, are not very reliable, and no dip will keep ticks off for an appreciable time.

(3) One may leave the ticks to purify themselves by keeping cattle off the pastures.

Judging from the life history of the ticks under discussion and that of a similar variety with which I had the opportunity of experimenting in Africa I think the period required would be about fourteen months. One could hasten the process, however, and at the same time utilise the pastures by fully stocking them with sheep, as these animals do not, of course, infect the ticks.

In attempting to deal with redwater in the preventive sense, it will no doubt be found that one of these three methods of prevention is more applicable to this or that district. Inoculation, I think, should be the last resource. A combination of (2) and (3) promises the greatest approach to finality, that is to say, cattle should be kept off infected pastures, which should be well stocked with sheep, and the sheep should be dipped at intervals of ten days, particularly in the season when adult ticks are in evidence.

That, gentlemen, is a short extract from the work which we have been doing on this subject. (Cheers).

Mr. SIMPSON, in the temporary absence of the President, said: Gentlemen, as intimated to you by the President before he left, there will be no discussion upon this paper now, but I trust on a future occasion an opportunity may occur when we may give it the consideration it deserves. (Cheers).

VOTES OF THANKS.

Mr. E. W. BAKER: Mr. President and gentlemen: Mr. Hunting has asked me to take upon myself the duty of proposing a hearty vote of thanks to our President, and it affords me the greatest possible pleasure to carry out that duty. (Cheers). Mr. Hunting has told me that few words are required in proposing this resolution, and that is a fact. All of you know the genial disposition of our President, and those of you who have attended the meetings have seen the able, pleasant and thorough manner in which he has conducted the ceremonies. There is one thing, Mr. President, I should like to say, and that is how very sorry I am that some of us have not considered you. We have in some of our remarks diverged from the subject too much; instead of bringing ourselves to the point we have wasted time, and as a result you have had to hurry away. But, gentlemen, I am quite sure you will agree with me that in Mr. Roberts we have one whose presence has been felt, and valued most highly, and I will therefore without further words ask you to pass a most hearty vote of thanks to him for the very able, efficient and thorough manner in which he has conducted the proceedings. (Cheers).

The resolution was put and carried with acclamation.

The PRESIDENT, who was received with cheers on rising to reply, said: Gentlemen, I am really more obliged to you than you are to me (No, no), for the excessive kindness I have met with on all hands has made it quite a pleasure for me to preside over this assembly. I assure that, before the meetings, it was with much fear and trepidation that I approached the Presidency. I thought I should fail; I thought my humble endeavours might not meet with the approval and wishes of the Association, and that as I had never done anything of the sort before I would make a foolish sort of President. But instead of that, as I have told you, your kindness has made me feel very much at home. I really feel most devoutly thankful to you, instead of you to me, or, if you must thank me, then I will say that the thankfulness is quite mutual, and that it has been a real pleasure and a labour of love to preside over you. All the members of this society are very dear to me. I have been a Member of the Association for a quarter of a century, and you may therefore guess that I do not lightly esteem the fellowship and friendship of its members. Whenever I have been able I have always attended the the meetings and taken the keenest delight and interest in them; but of late years my son, who also delights in the Association and loves its meetings, and who is a keen man after professional knowledge, has gone in my place, because we could not both go. So that if you do not see me so often now you will see my son, who is, I think, a good representative. (Cheers). Gentlemen, I can only say that I thank you again for the thanks that you have accorded to me. It has been a real pleasure to me to occupy the Chair. (Cheers)

Dr. JAMES McI. McCALL: I have a very pleasant duty to perform, and that is to propose a hearty vote of thanks to the gentlemen who have prepared the papers which have been brought before the National on this occasion. We have only to read these papers to recognise what an immense amount of time and labour must have been expended upon them. The proof that these papers have been excellent has been furnished by what has taken place at the meetings. Almost every gentleman who has spoken has prefaced his remarks by saying that the essayist has produced a most interesting and instructive contribution, and as a consequence we have had discussions which have lasted, not only during the legitimate hours which it was intended should be occupied by discussions, but after the stated time for closing the meeting we still find food for discussion which may last for several hours longer. I think all this points to the fact that the papers have been a real success, and those who attended here have derived much information from them. I therefore ask you to tender the gentlemen who wrote the papers a very hearty vote of thanks. (Cheers).

The resolution was carried by acclamation.

Mr. N. ALMOND: I have great pleasure in proposing a vote of thanks to an important set of gentlemen who have contributed to the discussions, namely, those who have opened the discussions on the papers. We know that those who prepare the paper have a practically illimitable time in which to do so, but those who open the debates are often at a disadvantage in this respect, although this Association is so well managed now that we usually have the papers beforehand. The opening of a debate is not always an unmixed blessing, nor is it always an agreeable thing to do. We know that sometimes those who open discussions are not necessarily in agreement with those who write the papers, and in this way an important duty is thrust on the gentlemen to whom I now ask you to accord a hearty vote of thanks. (Cheers).

The resolution was carried by acclamation.

Prof. G. H. WOOLDRIDGE: I have great pleasure in proposing a vote of thanks to the Provisional Committee, to whom we are very greatly indebted for the pleasant time we have had down here apart from business. We are indebted to them, in the first place, for providing us with such nice quarters in which to conduct our meetings, and also for the arrangements which were made for our sumptuous repast last night. I do not think anything I can say will increase the heartiness with which you will accord this vote of thanks to the Provisional Committee, particularly Mr. Burt, Mr. Stuart, Mr. Todd, and others of the Committee who have rendered able assistance. (Cheers).

The resolution was carried by acclamation.

Mr. G. HOWE: Gentlemen, The proposition I have to make is that the best thanks of the meeting be given to the old War Horse who is still at the head of this Association, I mean Mr. Hunting (Cheers). We all know that whatever Mr. Hunting takes in hand is bound to be a success, and, as we heard last night, if it had not been for the efforts put forward by him the Association would have died of syncope. I also include in this resolution the name of Mr. Simpson, who I am sure we are all very proud has taken up the position of Treasurer owing to the lamented death of Mr. Wragg. As long as these two gentlemen occupy their respective positions, I am sure the Association will not only survive, but will have a long and useful career. (Cheers).

The resolution was carried by acclamation.

The PRESIDENT: Gentlemen, that concludes the business part of our Proceedings for the year.

LIST OF MEMBERS OF THE NATIONAL VETERINARY ASSOCIATION, 1908-9.

Those marked (*) are Life Vice-Presidents.
,, ,, (1) have served as President.
,, ,, (2) ,, as Vice-President.
,, ,, (3) ,, on the Council.
,, ,, (4) ,, as Treasurer.
,, ,, (5) ,, as General Secretary.
,, ,, (6) ,, on Provisional Committee.
,, ,, (7) ,, as Local Secretary.
,, ,, (8) ,, written papers for discussion.
,, ,, (9) ,, opened discussions.
(F) signifies Fellow of the Royal Coll. Vet. Surgeons.

Abson, J., (F) (2, 3, 6, 7) 53 Norfolk St, Sheffield
Aitken, John, Junr., Dalkeith
Allen, Chas. (F) (* 1, 2) Dublin
Almond, N. (F) (8) Cambridge House, Kingston-on-Thames
Ascott, Wm. (6) Bideford
Atcherly, Jas. (6) Harrogate
Auger, A. S., (6, 9) Saxmundham
Auger, T. E., (6) Wymondham, Norfolk
Awde, W., (F) (2,3,6) Stockton-on-Tees
Baird, A., York Lane, Edinburgh
Baker, E. W., (2) Wimborne, Dorset
Balls, R. W. S., 108 King Street, Great Yarmouth
Banham, Geo. A., (F) (2, 3, 5, 6, 7, 8), Cambridge
Barcham, T. E., North Walsham
Barling, F. W., (3, 6) New House, Ross, Herefordshire
Batt, T., (6) 469 Oxford St., London
Bayley, A. E., 144 Lordship Road, N.
Beart, W. J., King's Lynn, Norfolk
Beckett, A. J., (6) Riverside, Sandymount, Dublin
Beddard, E., (F) (2,3) Cleveland Road, Wolverhampton
Bell, G. J., 2 High Street, Wandsworth
Bell, John J., (2, 3, 6) Carlisle
Berry, A. H., 30 Atherfold Road, Stockwell, S.W.
Blackhurst, C., Broughton, Preston
Blakeway, Jno., (F) (6, 7) Chaddesley Corbet, nr. Kidderminster
Bloxsome, Gerald W., (6) 15 Davigdor Road, Hove
Bloye, W. H. (F) (* 1. 2, 3) Ebrington Street, Plymouth
Bond, P. G., (6, 7) Plymouth
Borthwick, Jas., Gateside, Kirkliston
Bowden, A. Cornish, 127 High Street, Beckenham
Bower, Wm., (* 1) East Rudham, Norfolk
Bowes, H. G., 106 Clarendon Rd, Leeds
Bowhill, T., Bacteriological Institute, Graham's Town, Cape Colony
Bowman, G. E., (6) Woodhouse Lane, Leeds
Bradley, O. C., (7, 8) Veterinary Coll., Edinburgh
Branford, Richd., 56 Worship Street, London, E.C.
Bray, C. T., (6) 139 Fordwych Road, West Hampstead
Broad, Alf., (F) (3,6) 8 Finchley Road, St. John's Wood, London
Broad, Arthur, 53 Elsham Road, London, W.
Brooke, W. H., (6) Handsworth, Birmingham
Brooks, H., Leadenham, Lincoln
Buckingham, H., Harleston, Norfolk
Burchnall, J. J. (6) Loughborough
Burrell, T., (6) 50A Brewer Street, Regent Street, London
Burt, Walter, Junr., (7) 2 Edward St, Brighton
Butler, E. R. C., (F) Lt. Col., A.V.C., (3, 9) War Office, Whitehall
Butters, A. L., (3) 31 South Wharf Road, Paddington
Byner, C. J., 18 Broad Street, Birmingham
Byrne, W. A., (2, 3, 8) Roscommon
Cameron, J., Bridge Street, Berwick
Carless, W., (2, 3, 6) Eastgate Street, Stafford
Carless, W. S., (2, 3) Worcester
Carr, F. U., Capt. A.V.C., Aldershot
Carter, J. H., (F) (2, 3, 6) Burnley
Carter, J. T, Potter, Endymion, Homafield, Rd., Gt. Malvern
Caton, H. W,, (F) 413 Mile End Rd., London, E.
Caudwell, W., (F) 20 London Street, Chertsey, Surrey
Challinor, C. E., (F) (6) Pendlebury
Chase, W. H., Mafeking, S. Africa

Chesterman, T. G., (6) Leman Street, Whitechapel, London
Clarke, W. R., 18 Gayton Road, Hampstead
Clarkson, J., Garforth, Leeds
Clifford, C. J., High Street, Rayleigh, Essex
Cockburn, R., (6) Eastwood, Notts.
Coe, J. W., (F) (3,6,7) Stoke-on-Trent, Staffs.
Connell, J. A., Lichfield
Connochie, T. D., Galashiels
Constable, D., (3, 6) Inchture, Perthshire
Cooke, J., (F) (6) 14 Elders Street, Scarborough
Craig, Prof. J. F., M.A., Royal Veterinary College, Dublin
Crowhurst, E. G., (F) (3) Leamington
Cunningham, C., (2, 3) Slateford, Midlothian
Cureton, W., Tenbury, Worcester
Daly, J. V., (3) Bo-Peep Island Bridge, Dublin
Darwell, A. H., (3, 6) Northwich, Cheshire
Davies, D. G., (2, 3) Swansea
Dawes, H. J., (F) West Bromwich
Dawson, W., (6) Cavan
Denington, W., 5 Neville Terrace, S. Kensington
Dewar, J. R. U., (F) (* 1, 8, 9) Prin. R.V.C., Clyde St., Edin.
Dixon, E. L., 11 Grosvenor Place, Margate
Dobbyn, A., (2, 3, 6) Waterford
Dollar, Jno. A. W., (6, 8) } 56 New Bond
Dollar, T. A. } St., London
Douglas, T. A., (6) Kilmarnock
Drabble, C., (3) Bradford
Duck, F., (F) C.B., Col. A.V.D. Kilindini, Cranes Park, Surbiton
Duckworth, T. H. L., Ashbourne, Derbyshire
Dudgeon, G. R., (3, 6) Sunderland
Dunlop, J. B., (6) Ailesbury Rd, Dublin
Dunne, G., 102 Upper George Street, Kingstown, Co. Dublin
Dunstan, J., Prof. (3, 6, 8) Liskeard
Edmondson, W., Wansford House, East Parade, Harrogate
Edwards, E. R., (F) Bd. of Agriculture, 4 Whitehall Place, London, S.W.
Edwards, F. G., (3, 6) Chester
Edwards, W. T., Windsor Rd, Neath
Elder, G. H., Taunton
Elder, W. A., Matthews Green, Wokingham
Elphick, G., (2, 3, 6) 67 Newgate St., Newcastle-on-Tyne
Faulkner, Ed., (* 1, 3, 6, 8) Knott Mill, Manchester
Fletcher, T. C., Ellin Street, Sheffield
Foreman, T., East House, Leadgate, R.S.O., Co. Durham
Forsyth, A. B., Cannock
Freeman, R. B., (2,6) Harry St, Dublin
Freer, B., (6) Uppingham, Rutland
Frost, T. A., High Street, Hounslow
Garnett, F. W., J.P., (* 1, 3, 9) Windermere
George, J., Magherafelt, Londonderry
Gibbings, G. H., (F) (3, 6) Tavistock
Giblin, M. T., (6) 3A Oldham Road, Rochdale
Gooch, F. L., (F) (2, 3, 6) St. Martin's, Stamford
Gooch, J. K., Holt, S. O, Norfolk
Goodall, T. B., (F) (2, 9) Christchurch, Hants
Gosling, J. A., 212 Goswell Road, E.C.
Grasby, W., (2, 6) Daventry
Gray, H., (6, 8, 9) 23 Upper Phillimore Place, Kensington, W.
Green, Herbert, (6) 26 Hampshire Terr, Portsmouth
Griffin, R., Skerries R.S.O.. Co. Dublin
Hamilton, D., Bourtreehill, Hamilton
Hammond, John, (2) Bale, Melton Constable
Hancock, W. A., (3, 6) Clowden House, Uxbridge
Harding, E. R., Salisbury
Hartley, Chas. (F) (2, 3, 6) Lincoln
Harvey, F., (F) (8) St. Columb, Cornwall
Haywood, Chas., Millstone Lane, Leicester
Healy, J. F., (2,6) Midleton, Co. Cork
Heatley, T. G., (6) Woodbridge
Hedley, M., (F) (* 1, 2. 3, 7) 6 Royal Terrace, Kingstown, Dublin
Heelis, L. W., Solihull
Henderson, J., 98 Gilmore Place, Edinburgh
Hepburn, W., Coldstream
Hewson, Frederick (6) Royston, Herts
Hill, J. Campbell, Town Hall, Llanelly
Hoare, E. W., (F) (2,6.8) 18 Cook St., Cork
Hobday, F., (F) (3 7, 8, 9) 165 Church St., Kensington, W.
Hobbs, F. C., Cardiff
Holburn, A., (6) Congleton, Cheshire
Holland, J., (6) Athy, Co. Kildare
Hopkin, Tedbar, (F) (2, 3, 6, 9) 15 New Bridge St., Strangeways, Manchester

Houston, W. F., (3) Paisley
Howard, C. W., 43 High St, Dorking
Howard, P. J., (2, 3, 8) Ennis, Co. Clare
Howard, P. S., (F) "Windermere," Cambridge Park, Wanstead, Essex
Howard, R., Thetford, Norfolk
Howe, G., (3, 6) Buxton
Howes, W. F., (6) Church Lane, Whitechapel, London, E
Howse, Henry, Lincoln
Huband, T. A., (F) (2) Langley Park, Newbury, Berks
Hughes, R., (F) (2, 3, 6) Willow Street, Oswestry
Hunter, H., (2, 3, 6, 9) New Bridge Street, Newcastle-on-Tyne
Hunting, C. S., South Hetton, Durham
Hunting, W., (F) (* 1, 3, 5, 6, 8, 9) 16 Trafalgar Sq., Chelsea, S.W.
Hurndall, J. S., (2, 3. 6, 8, 9) 2 Cornwall Gardens Stables, Kensington
Hutton, J., (F) (6) Pringle Bank, Kelso, Roxburghshire
Inglis, T. M., Forfar
Ison, W. E., Atherstone
James, J. C. (F) Thornbury, Glo'ster
James, W. H., Frome
Jermyn, W. R., Clifton, Bristol
Johnson, A. A., (F) Campbell Road, Twickenham
Johnston, J. E., May Street, Belfast
Jones, C., (6) Vet. Dept. Dublin
Jones, J. T. Share, Liverpool University
Jones, R., Towyn, Merionethshire
Jones, T. Eaton, (6,9) Municipal Builds. Liverpool
Jowett, W., (F) (6) Cape Town
Jurgenson, W. M., (6) Ipswich
Kendall, W., (F) Buccleuch Street, Barrow-in-Furness
Kerr, F. (2, 3, 6, 7) Vet. Dept., Dublin
Kidd, H., (F) (2, 3, 6, 8) Exe View, Exmouth
King, H., (6) 155 Lower Kennington Lane, S.E.
King, J., (6, 8, 9) Islington Market, London
Laithwood, James, (F) (3) Congleton
Lambert, R. H., (6) 47 South Richmond Street, Dublin
Lambert, T. D., (F) (2, 3, 6) 47 South Richmond Street, Dublin
Latta, J., (7) Hartley Street, Ulverston
Lawson, A., Manchester
Leach, E. H., (F) (2) Newmarket
Leigh, F., (F) Cheriton, Westbury-on-Trym
Lepper, H. G., (3) Aylesbury
Levie. A., Broad Street, Nottingham
Livesey, Geoffrey H., (6, 8) 15 Davigdor Road, Hove
Lloyd, J. S., (F) D.V.S.M.Vict., (6,8,9) Town Hall, Sheffield
Locke, G. H. } Grosvenor Street,
Locke, S., (2, 3, 6) } Manchester
Lomas, S., Wilmslow, Manchester
Low, F., St. Giles, Norwich
Lowe, G. C., Oxley Street, Dockhead. S.E.
Macarthur. J., (3) Southminster, Essex
McCall, J., (F) (* 1, 2, 3, 8, 9) Principal, Vet. College, Glasgow
McCall, J. R., Buccleuch Street, Glasgow
McCall, James McI., (3) Board of Agriculture, 4 Whitehall Place, S.W.
MacCallum, A. I., (3, 6) 30 Kings Stables Road, Edinburgh
M'Fadyean, Sir John, (F) (* 1,2,3,8,9) Principal R.V.C., London
Macfarlane, D., (3) Doune, Stirling
McGavin, James, (2, 3, 9) Montgomery
McGowan, J. A. B., Capt. A.V.C., The Barracks, Leeds
Macgregor, W. A., 3 Castle Hill Road, Ayr
Mackinder, J., (F) (* 1, 3, 6) Peterborough
McKenny, J., (2, 3, 8) Dublin
McKinna, Jno., (F) (3, 6) Huddersfield
Macqueen, J., (F) (2, 3, 5, 6, 8, 9) R.V.C., Camden Town, London
Magee, L. M., (6) 103 Main Street, Bray, Ireland
Mahony, B. P. J. (3, 6) Annefield, Maryborough. Ireland
Malcolm, J., F.H.A.S., (F) (* 1, 3, 5, 6, 7), Holliday Street Wharf, Birmingham
Male, G. P., 250 Kings Road, Reading
Margarson, E., (6) Swaffham
Marston, Alfred, Estancia, Miraflores, Maipu, Buenos Aires, S. America
Martin, Major E. E., A.V.C., (8), India
Martin, J. B., (2, 3, 6) Rochester
Mason, A. W., (F) (* 1, 6) North Street, Leeds
Mason, F. C., (6) Newtown Park, Co. Dublin
Mason, F. E., Cairo
Matthews, Geoffrey, Man of Ross House, Ross
Meredith, J. A., (F) Major A.V.C., Vron Vyrnwy, Llanfechan, Llanymynech SO. Montgomeryshire
Mellett, E. J., Hart Street, Henley-on-Thames
Mettam, A. E. (2,3,6,9) Principal R.V.C.I. Pembroke Road, Dublin
Miller, G. B., 32 Nottingham Street, Dublin

Mitchell, George M., 5 Albion Place, Sunderland
Mullane, P. J., 129 Claude Rd, Cardiff
Mulvey, W. J., (F) (2, 3, 6) 116A Kings Road, Chelsea, S.W.
Munro, J., Altrincham, Cheshire
Nelder, W. B., (F) Exeter
Newsom, G., (3,6) Ashford, Co. Wicklow
Nisbet, J. B., (F) Fence Houses, Durham
Nixon, H., Sheffield
Nolans, J. W., (3) Cumberland Street, Birr, Ireland
Norris, J. H., (6) 24 Upper Georges Street, Wexford
Norwood, W. W., (6) Connisbro', Yorks
O'Connor, J. J. Prof. Royal Vet. Coll., Dublin
Olver, T., (3) Trafalgar Square, Truro
Over, Alf., (2, 3, 6) Rugby
Owen, E. P., (3, 6, 7) Thame, Oxford
Oxenham, A. W., Glyn Gwyn Farm, Mountain Ash
Pack, C., (2) Lymington, Hants
Packman, W., (3, 6) Bury, Lancashire
Pallin, Capt. W. A., A.V.C., Curragh, Co. Kildare
Parker, J. H., Faringdon
Parker, J. M. (* 1, 3, 6) 9½ Moore St., Birmingham
Parkinson, J. J., Maddenstow Lodge, Curragh Camp
Parr, J. G., (3) Humberstone Gate, Leicester
Parsons, C. F., 13 Albion St, Cheltenham
Patrick, W. Cargill, (F) (3,6) Mullingar
Pauer, W., Blackwater, Hants
Peddie, James, (9) Dundee
Penberthy, J., (F) (2, 3, 5, 6, 7, 8, 9) Dean Hall, Newnham, SO., Glos.
Perry, J., Cardiff
Pethick, R. S. Tiverton
Phillips, J. T., Nantgaredig, Carmarthenshire
Pike, J. S., Rutland Street, Swansea
Pollock, J., (F) (6) Norwich
Porch, R., (F) (2, 6) 6 Star Road, West Kensington
Pratt E. H., Northallerton
Prentice, D. S., Dept. of Agric., Dublin
Preston, J., (F) (2,6) Mallow, Co. Cork
Price, E., (2) Birmingham
Price, T. S., (2, 3) 30 Brixton Hill, London, S.W.
Pugh, D., (F) (3, 6) Sevenoaks, Kent
Rea, C., (6) Clonmel, Co. Tipperary
Reeman, W. M., (6) Bury St. Edmunds
Rees, J. F., Lammas Street, Carmarthen
Rees, W. D., Bryn Bedw, Tylorstown, Pontygwaith, S.O., Glam.
Reilly, Col., (6) United Service Club Dublin
Reilly, T., (6) Navan, Ireland
Renfrew, Arch, Broadway, Worcester
Reynolds, H. S., Daventry
Riddoch, J., (6, 8) 7 Glengyle Terrace, Edinburgh
Rimmer, R., (6) 52 Stramongate, Kendal
Robb, Andrew, (F) (3) } Ward Street,
Robb, W., (F) } Glasgow
Roberts, Chas., (6) 8 Church Row, Tunbridge Wells
Roberts, H. Keeling, The Govt. Offices, Blœmfontein, O.R.C., S. Africa
Roberts, Horace L., (F) (3, 6) 55 Willoughby Terrace, Ipswich
Roberts, R., (F) (1, 3, 6, 8) Tunbridge Wells
Robertson, J., Stalham, Norwich
Robinson, M., (6) Barnsley
Rogerson, A., (F) (6) 180 Camden Road
Ross, J. J., (2, 3, 6) May Street, Belfast
Routledge, A. R., Karnak House, Louth, Lincs.
Rudkin, T. A., (2, 6) Grantham
Runciman, T., (2, 6) Ely, Cambs.
Russell, E. C., Lieut. A.V.C. Saharanpur, India
Rutherford, R., (F) (2, 3, 6, 9) 12 Bread Street, Edinburgh
Ryan, E. A., Strokestown, Co. Roscommon
Sampson, S. E., Hillsboro' Sheffield
Samson, F. G., (3, 6) Upper Green, Mitcham, Surrey
Savage, W., Bangor
Schofield, W. G., Pontefract
Scott, R., Ambleside
Shave, E. S., (F) (6) R.V.C., Camden Town, London
Sheather, Chas., (F) (3,6,9) 50A York Terrace, Regents Park, London
Shipley, W., (F) (* 1, 2, 3, 7) South Town, Great Yarmouth
Simpson, J. F., J.P., (F) (* 1, 2, 3, 4, 6) Maidenhead, Berks
Slocock, S. H., (F) (3, 6, 8) 188 High St, Hounslow
Smart, W. W., (3) Foreign Cattle Market, Deptford, S.E.
Smith, A., Lieut. A.V.C., War Office
Smith, Fred., (F) C.B., (2,8,9) Maj.Gen. A.V.S., Glenluce Rd., Blackheath
Smith, G., Tunstall
Smith, Sidney, (6) High St., Lowestoft
Snarry, H., (3, 6) Bootham, York

Somers, F. W., (6, 7) 4 Wade Lane, Leeds
Spencer, Trevor, (3, 6) Kettering
Spicer, A., Crabwood, New Oxted
Spreull, A., (6) Dundee
Stainton, W. A., (F) (6) 409 Hornsey Rd
Steel, Chas.,(F) (2,3) Lieut.-Col.A.V.D. United Service Club, Dublin
Stent, E. H., Hulme, Manchester
Stephenson, C., (F) (6, 9) Sandyford Villa, Newcastle-on-Tyne
Stewart, A. C., Neville Street, Cardiff
Stewart, J. M., Swansea
Stockman, S., (2, 3, 8, 9) Board of Agriculture
Storrar, D. M., (F) (6) Abergavenny
Stroud, E. L., (F) (6) 29 Spring St., Hyde Park, W.
Sumner, H., (6) Chapel Court, 15 Vauxhall Road, Liverpool
Tagg, J., Constitutional Club, Northumberland Avenue, W.
Tailby, M. (3,6) Dalton St, Birmingham
Tayler, R. C., (6) Colchester
Taylor, F. B. O., (6) Weston, Norwich
Taylor, F. J., (6) Moseley, Birmingham
Taylor, W. A,, (F) (3, 6) Turner St., Manchester
Temple, J., Aberaman, Aberdare
Tennant, R. C., (6) Thames Street, Windsor
Thackeray, H., Stafford
Thompson, Hy., (3, 6, 9) Aspatria, Cumberland
Thompson, J. A., (F) (3) Lurgan
Thompson, Jas., 63 Fountainhall Road, Aberdeen
Thomson, H., C.B., Maj.-Gen., A.V.S., Essilmont House, Bedford
Thomson, J., (6) Coventry
Tipper, L. C., Balsall Heath, Birmingham
Todd, A. G., Capt. A.V.C., Messrs. Holt & Co., Whitehall Place, S.W.
Todd, J. Alex., (3, 6) Chapel Road, Worthing
Trigger, R. C., J.P., (F) (* 1, 2, 3, 6) Newcastle-under-Lyme, Staffs.
Tucker, F. J., "Geltsdale," Monnero Street, Monmouth
Tyson, G. W., Kilshane House, Finglas, Co. Dublin
Verney, R. J., (6) Oxford
Villar, Sidney, (F) (3, 6, 7, 8, 9) Amersham Common, Bucks
Wartnaby, Geo., (3,6) Burton-on-Trent
Weighill, W. L., Southgate Street, Gloucester
Weighton, A., 1 Park Street, Anlaby Road, Hull
Weir, J., (F) (3, 6, 7) 35 St. Andrew's Drive, Pollockshields, Glasgow
Wharam, Samuel, (6) Leeds
Wheatley, Albert, (F) (2, 3, 6) Friar Street, Reading
White, J. H., 98 Mark Lane, Liverpool
Whitecross, J. W., (2) 43 Eden Street, Kingston-on-Thames
Wilkinson, H. E. (6) Martham nr. Great Yarmouth
Wilkinson, W. H., (3) Great Britain Street, Dublin
Willett, F. W., (6) Staines
Willett, J., 6 Harley Place, London, W.
Williams. M. E. Pentre, Glamorgan
Williams, W.O., (1,2,3,6,9) Vet. School, The University, Liverpool
Williams, W. R., Bridgend, Glam.
Wilson, Ainsworth, (6) Witham
Wilson, P., Glenmore, Lanark
Wilson, Wm., (F) (3) Berkhampstead
Winter, E. C., (F) (3, 6) Queen Street, Limerick
Wolstenholme, J. B., (F) (2, 3, 6, 7, 9) 102 Quay Street, Manchester
Wood, E. E., Cranmore, Little Sutton, Chester
Woodger, Joseph, (3, 6) Sutton Court Road, Chiswick Park, London
Woodruff, H. A., (7) Royal Veterinary Coll., London, N.W.
Woods, W., (F) (2, 3, 6) Wigan
Wooldridge, G. H., (8) R. V College, Camden Town, London, N.W.
Wyllie, D., Tudor House, Staines
Young, W. Jackson, 39 Leamington Terrace, Edinburgh

HONORARY MEMBERS.

J. Cossar Ewart, M.D., F.R.S., Edinburgh,
Dr. B. Bang, Copenhagen.
Rubert Boyce, F.R.S., Liverpool,
J. A. Murray, M.D.

Total number of Members, 367.

If any errors occur in the above list, please communicate with the General Secretary, W. Hunting, 16 Trafalgar Square, Chelsea, S.W.

24ColorCard CameraTrax.com™

RULES

OF THE

National Veterinary Association

1908.

Printed by H. & W. Brown,
20 Fulham Road, S.W.

INDEX.

RULE

NAME 1
OBJECTS 2
INCOME AND PROPERTY 3
INVESTMENTS 4-5
PRESENTATIONS 6
COMMUNICATIONS 7
ALTERATION OF RULES 8
WINDING-UP 9

GENERAL MEETINGS—

First 10
Subsequent 11
Special 12
Organisation of 13
Notice of 14
Quorum 15
Chairman of 16-17
Introduction of Strangers to 18
PUBLICATION OF PROCEEDINGS 19

MEMBERS—

Qualification of 20
Admission of 21
Resignation of 22
Exclusion and Expulsion 23

HONORARY MEMBERS—

Qualification of 24
Privileges of 25

FEE AND SUBSCRIPTION—

Admission and Annual 26
Membership 27
Arrears of 28
OFFICERS 29

THE PRESIDENT—

Election of 30-31

Duties of—

Occupy the Chair 32
Sign Minutes 33
Address of 34
Substitute for 35
THE VICE-PRESIDENTS 36

RULE

THE COUNCIL—

Constitution of 37
Duties of 38-39
Meetings and Quorum of 40
Committees 41
Report of Association 42
Place of General Meeting, etc. 43

THE TRUSTEES—

Appointment of 44
Vacancy of 45

THE TREASURER—

Ex-officio Member 46
Duties of 47
Surplus Cash 48
Auditing Accounts 49

THE GENERAL SECRETARY—

Duties of 50

THE PROVISIONAL COMMITTEE—

Election of 51
Number of 52
Officers of 53
Chairman of 54
Local Secretary 55
Organisation of Meeting 56
Programme of Sittings 57
Nomination of Writers of Subjects 58
Subjects, etc., for Discussion 59
Major Subjects 60
Minor Subjects 61
Time at which Subjects must reach the Local Secretary 62
Time allowed for Reading Papers and Speaking at Meetings 63

RULES

OF THE

National Veterinary Association.

NAME.

1. The Association shall be styled the "NATIONAL VETERINARY ASSOCIATION."

OBJECTS.

2. The objects of the Association are to promote and advance Veterinary medical and allied sciences, and maintain the honour and interests of the Veterinary profession, by the aid of all or any of the following:—

(1) By holding General Meetings of the Members of the Association and profession generally, from time to time, in various parts of the country, for the discussion of Veterinary topics, etc.

(2) By the publication of the proceedings of meetings of, or other information pertaining to, the Association, as the Council may determine.

(3) By granting sums of money out of the funds, or assisting in obtaining grants from Government or elsewhere, for investigating animal diseases, or otherwise promoting Veterinary science.

(4) By such other lawful things, as are incidental or conducive to the attainment of the above objects.

INCOME AND PROPERTY.

3. The income and property of the Association, from whatever source derived, shall be applied solely towards the promotion of the objects of the Association, and no portion of it shall be paid or transferred directly or indirectly, by way of dividend, bonus, or otherwise by way of profit, to the persons who at any time are, or have been, Members of the Association, or to any person claiming through any of them: Provided that nothing herein shall prevent the payment in good faith of remuneration to any person in return for services actually rendered to the Association.

INVESTMENTS.

4. All surplus monies shall be invested in the names of the Trustees in such securities as shall be approved of, and directed by, the Council.

5. The principal of these sums shall not be expended without the sanction of the Council, but the interest thereof shall be paid by the Trustees to the Treasurer for the purpose of the current expenditure of the Association.

PRESENTATIONS, Etc.

6. The name of every person who shall make a present to the Association shall be entered on the Minutes, with the mention of the gift.

COMMUNICATIONS.

7. All communications to the Association shall be the property of the Association, unless the "Provisional Committee" allow the right of property therein to be specially reserved to the contributors.

ALTERATION OF RULES.

8. No rule of the Association shall be altered except at an Annual General Meeting, and written notice of such alteration shall be given to the General Secretary before such meeting.

WINDING UP.

9. In the event of the Association being wound up, every member undertakes to contribute to the assets of the Association during the time that he is a Member, or within one year afterwards, for payment of debts and liabilities of the Association contracted before the time at which he ceases to be a Member, and the costs, charges, and expenses of winding up the same, and for the adjustment of the rights of contributories among themselves, such amount as may be required, not exceeding the sum of one guinea. Any surplus which may be remaining at the time of winding up shall be expended on the promotion of Veterinary science, as the Council may deem proper.

GENERAL MEETINGS.

10. *The First General Meeting* shall be held in London on the day following the next Annual Meeting of the Royal College of Veterinary Surgeons, in May, 1883.

11. *Subsequent General Meetings* shall be held from time to time in different parts of the Kingdom, as may be determined by the Council.

Special General Meeting.

12. The Council shall, upon a requisition made in writing to the President by any ten or more Members, convene a *Special General Meeting*, provided the objects of the meeting are specified in the request.

Organisation of General Meetings.

13. The arrangements for holding the Annual General Meetings shall be under the Management of, and organised by, the " Provisonal Committee " elected by the Council from among the Members of the Association.

Notice of General Meeting.

14. Due notice (seven days at least) shall be given to the Members specifying place, day, hour, and objects of the General Meeting.

Quorum of General Meeting.

15. No meeting shall be held unless there are at least fifteen Members present at the commencement of such General Meeting.

Chairman of General Meeting.

16. The Chairman of the General Meeting shall be the President of the Association, or, in his absence, one of the Vice-Presidents, or, if neither of these are present within twenty minutes after the time appointed for holding the same, the Members present shall appoint some one of their number to preside as Chairman.

17. The Chairman may, with the consent of the meeting, adjourn any of the business of that meeting.

Introduction of Strangers.

18. Each Member shall have the privilege of inviting a stranger to the General Meeting. Cards for this purpose will be forwarded to Members on application to the General Secretary.

PUBLICATION OF PROCEEDINGS.

19. The Proceedings of the Association shall be published at such times and in such manner as the Council shall direct.

MEMBERS.

Qualification of Membership.

20. The Members of the Association shall be holders of the Diploma of the Royal College of Veterinary Surgeons, or the Veterinary Certificate of the Highland and Agricultural Society, who conform to the Rules of the Association.

Candidates for Admission.

21. Every Candidate for admission into the Association shall be proposed by two or more Members, who shall deliver a paper, signed by themselves, to the General Secretary (or other person

appointed by the Council), specifying the Christian and Surname of such person, together with his place of residence, and that he is a fit and proper person to be a Member.

Resignation.

22. Any Member wishing to withdraw from the Association shall give written notice of such intention to the General Secretary, on, or before, the 1st of December of the current year.

Exclusion or Expulsion of Members.

23. The terms and conditions which may prevent any person entitled by Rule 20 to become a Member of the Association, and the circumstances under which any Member may be expelled from the Association, shall be prescribed from time to time by the Council; subject to confirmation by the General Meeting of the Association.

HONORARY MEMBERS.

Qualification of

24. Honorary Members shall consist of eminent professional or scientific person, and others not qualified for admission under Rule 20, who may render distinguished service to the Association or the Veterinary profession, such persons having been recommended by the Council at the General Meeting.

Privileges of.

25. Honorary Members shall not be entitled to any vote, or any privileges beyond that of attending the General Meetings; Nor shall they be subject to any of the liabilities of Members.

FEE AND SUBSCRIPTION.

26. Every person shall pay the Association the sum of 10s. 6d. annually, payable in advance on the first day of each year. But every Member may compound for his annual subscription by paying at once the sum of *five guineas.*

27. No person shall be considered a Member till he has paid his subscription for the current year.

Arrears

28. All Members whose subscription shall not have been paid before the 31st of December of each year shall be suspended from all privileges of membership; and if still in arrear at the end of the succeeding year he shall cease to be a Member, and shall not be eligible for re-admission until he shall have paid all arrears due from him at the period of his suspension.

OFFICERS.

29. The officers of the Association shall be a *President; Vice-Presidents*; *Council; Trustees; Treasurer; General Secretary;* and a "*Provisional Committee,*" with its *Chairman* and *Local Secretary.*

THE PRESIDENT.

Election.

30. The President shall be elected at the Annual General Meeting; at the termination of which he shall enter upon the duties of his office.

31. Each retiring President shall be eligible for election as a Vice-President for life, provided that he continue to be a Member of the Association.

Duties of Occupying the Chair.

32. The President shall take the chair at the General and Council Meetings, state and put questions, maintain order, and see that the Rules of the Association are carried out.

Sign Minutes

33. After the Minutes of each Meeting are read over, he shall, with the Approbation of the Meeting, sign them as a voucher for their accuracy.

President's Address.

34. He shall deliver an address to the Members of the Association at their Annual General Meeting.

Substitute for President.

35. In the absence of the President, one of the Vice-Presidents, or, in their absence, one of the Members present, shall be elected to the chair, and carry out the duties of the President.

THE VICE-PRESIDENTS.

36. In addition to the life Vice-Presidents there shall be six others nominated by the Council from the Members of the Association, and elected at the Annual General Meeting.

THE COUNCIL.

Constitution of.

37. The following shall constitute the Council, provided always they are Members of the Association :—

(1) The President, late President, Vice-Presidents, Treasurer, and General Secretary of the Association.

The Chairman and Local Secretary of the "Provisional Committee."

(2) The Presidents and Secretaries for the time being of the Local Veterinary Medical Societies in league with the Association.

(3) Twelve others, elected at the General Meeting from the Members of the Association, residing in various parts of the Kingdom.

Duties of the Council.

38. The Council shall manage the affairs and business of the Association.

39. All questions at the Council shall be determined by vote; and in case of an equality of votes the President shall have a casting vote.

Meetings of Council.

40. The Council shall hold its meetings at the time and place of the General Meeting of the Association, and at such other times and places as they shall appoint; and also if summoned by the Provisional Committee, or a requisition signed by not less than ten Members of the Association.

Five Members of the Council shall be a *quorum*.

Committees.

41. The Council shall have the power to form Committees, composed of one or more Members of the Association to consider special subjects and report thereon to the Council.

Report of the Association.

42. The General Secretary shall prepare a Report of the general state and proceedings of the Association for the current year, to be presented by him at the Annual General Meeting.

Place of Meeting, etc.

43. At each Annual General Meeting the place for the following Annual General Meeting shall be selected, and the President, Vice-Presidents, Treasurer, and General Secretary shall be elected.

THE TRUSTEES.

Appointment.

44. The Council shall appoint three Trustees for the Association.

Vacancy.

45. In case of any vacancy in the office of Trustee, the Council shall, at their next or some subsequent Meeting, fill such vacancy by ballot.

THE TREASURER.

46. The Treasurer shall be *ex-officio* a Member of the Council and Provisional Committee.

Duties.

47. The Treasurer of the Association (or some persons appointed by him) shall receive the subscription and other monies payable to the Association, and discharge all accounts, and pay all sums of money under the direction of the Council.

Surplus Cash.

48. All sums of money in the hands of the Treasurer, which shall not be immediately required for the use of the Association, shall be invested in the names of the Trustees in such securities as shall be approved of and directed by the Council.

Auditing Accounts.

49. Two Auditors shall be appointed annually by the Council, to certify to the correctness of the accounts of the Association.

THE GENERAL SECRETARY.

Duties.

50. He shall be present at the Meetings of the Association and Council, read the minutes, orders, and entries of the preceding meeting, superintend their respective minutes, conduct the correspondence of the Association and the enforcement of the regulations as regards those in arrears, and act in general obedience to the direction of the Council. Also he (or they) shall be *ex-officio* Members of the "Council" and "Provisional Committee.

THE PROVISIONAL COMMITTEE.

Election.

51. The Provisional Committee shall be elected by the Council, from among the Members of the Association.

Number.

52. The Committee shall consist of twenty-four persons besides the Council of the Association, the Members of which shall be *ex-officio* Members of the Provisional Committee.

Officers.

53. A *Chairman* and a *Local Secretary* shall be elected from among themselves.

The Chairman.

54. The Chairman shall preside at the Meetings, and have similar powers to the President at the Association Meetings.

The Local Secretary.

55. The Local Secretary shall attend the Meetings of the Provisional Committee, record the minutes, conduct the correspondence, and act in general obedience to the direction of the Committee.

Organisation of General Meeting.

56. The Provisional Committee shall make arrangements for, regulate the business of, and otherwise organise the General Meeting.

Programme of Sittings.

57. They shall control the programme for the General Meeting.

Nomination of Writers of Subjects.

58. They shall nominate the writers of the major subjects to be brought forward, and shall take cognizance of any matters which require immediate decision.

Subjects for Discussion.

59. The Provisional Committee shall have power to accept, decline, or postpone any Papers, and to arrange the order in which they shall be brought before the Meeting.

Major Subject.

60. These shall he upon any Veterinary matters (subject to Rule 59) brought before the Meeting in the form of a written Paper ; upon which the Members will be invited to express their opinions.

Minor Subjects.

61. These shall be merely questions submitted to the Meeting in writing by Members of the Association (subject to Rule 59) and upon which no discussion shall take place.

Time for Sending in Papers.

62. All Papers intended to be brought before the General Meeting must be forwarded to the General Secretary at least one month before the Meeting is to take place.

Time allowed for Reading Paper, etc.

63. The reading of any Paper shall not occupy more than twenty minutes and, during the discussion, no person shall speak more than once, or for more than ten minutes, without permission from the Chairman.

Printed by H. & W. Brown, 20 Fulham Road, London, S.W.